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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O FEBRUARY 10, 1898. CHICAGO, ILL. NUMBER 6

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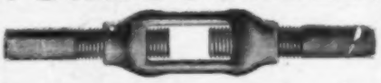

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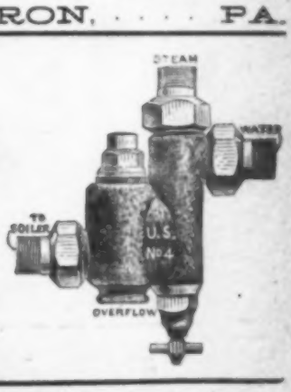

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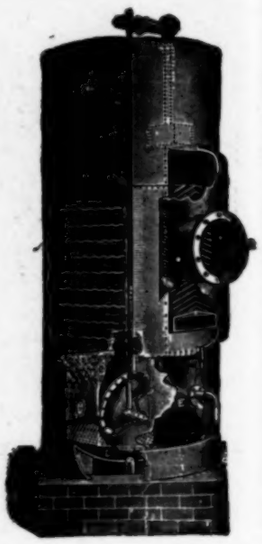

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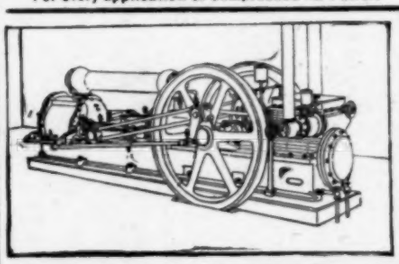

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. FEBRUARY 10, 1898. CHICAGO, ILL. NUMBER 6

THE WEEK IN IRON CIRCLES.

Bessemer pig iron has been the interesting, not to say sensational, feature of the iron market the past week. In all the record of its surprising performances this is perhaps the most remarkable, both for its suddenness and for the temporary inability of the trade to read its significance. Bessemer for prompt shipment, from having sold at $9 in the valley on Wednesday of last week had gone to $9.50 in the next two days, and the distinct buying movement that brought the rise involved upward of 7,000 tons of prompt iron besides 25,000 tons for later delivery. It was but a step from the depths in which Central Western furnacemen found themselves, to a basis giving a small margin, at least, above cost; and it was not until the surplus iron in the valleys had been gathered up, most of it at prices below $9.50, that furnacemen realized that a strong consuming interest was the buyer. About 75,000 tons is credited to Pittsburg, and the Cleveland and Chicago districts are reported to have taken smaller blocks, though the Western interest's participation in the buying is not definitely established. That it has had no surplus metal, even with the Union Works going, is a matter of report. It need scarcely be said that the events of the week have put a new face on the situation in the valleys and Pittsburg, and that the extent of the operations of the large steel companies, as thus indicated, have made pig iron producers hopeful who for two weeks past have seen little chance for better things except in curtailment. The buying came at a time, too, when it could be serviceable in fixing the lines of the iron ore trade for 1898. Foundry irons are not affected as yet by the Bessemer movement. In the far East, particularly in New England, foundrymen have been light buyers, of late, and weakness has been evident in several directions, in spite of the large aggregate consumption. Southern furnacemen expect that this week's meeting will bring about substantial agreement on $7.50 Birmingham for No. 1 foundry, $7.25 from No. 2, $9 for No. 3, and $6.50 for No. 4 foundry and gray forge. All interests, with one exception, are reported to be favorable to such an arrangement. Northern sellers have made low prices of late, and some valley sales have gone quite below $9.25 for No. 2, while Pittsburg transactions have been under $10. Lake Superior charcoal continues active at low prices, one or two liquidating interests disposing of stocks at a sacrifice. Most of this iron is now believed to be out of the way. The new business closed in finished material has included no noteworthy tonnage, but at the rate of specifications on old contracts and the pressure under which mills are going, it is plain that consumption is keeping up at the high mark of December and January. Yet mills that have order books filled for weeks ahead are far more eager for new business than in times past when similarly supplied with work. There is a general feeling that competitors must not be allowed to get any advantage, and prices are kept down. The expectation of a spring buying movement that may give some firmness to the market is general; on its fulfillment hangs the situation of the next few months. The bar iron manufacturers' meeting appointed for Chicago has been postponed. Meantime business is done on the old basis. Both East and West, bar iron and bar steel are the weakest articles in the list. Steel billets have been strengthened by the advance in Bessemer, and $15, Pittsburg, is minimum, as against transactions 15 and 20 cents lower last week. Sheet and tin plate bars and wire rods are strong. Wire and wire nails hold the advance of $1 a ton noted last week under strong present and prospective demand.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1142 MONADNOCK BLOCK, Feb. 9.

Business seems to be running along smoothly at a steady gait, with no great changes in either sales or the demand for material. The amount of tonnage closed last week was fully up to that of the week previous in most branches of the market, and the demand indicates that sales will continue steady in the future. There have been no changes in prices, but advances in some products may be announced within a short time. The Southern pig iron producers held a meeting at Birmingham last week to discuss prices and the general situation, and while nothing was done then, it is expected that at another meeting to be held this week something may be done to advance prices 25 cents a ton.

PIG IRON.—Both Northern and Southern sellers report a good week's business. The largest order, probably, was one of 1,500 tons. The meeting of Southern producers at Birmingham this week is expected to result in a slight advance in prices, and if it is made it will undoubtedly be followed by greater firmness in Northern irons. The local furnaces are full of orders, and are not pushing for business. For the past several weeks they have been selling their output every week, and with the orders taken previously, are now in position to be independent. Sales of Lake Superior charcoal iron are quite large, and have been made, in some instances, at prices under those we quote. Furnaces that are idle, with no immediate prospect of resuming, are realizing on accumulated stocks.

Lake Sup. Charcoal	$12 00@12 50	South'n Coke No. 3	$10 10@10 35
Local Coke Fdy. No. 1	11 00@11 50	Southern No. 1 Soft	10 60@10 85
Local Coke Fdy. No. 2	10 50@11 00	Southern No. 2 Soft	10 35@10 85
Local Coke Fdy. No. 3	10 25@10 50	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 50@11 00	Alabama Car Wheel	16 00@17 00
South'n Coke No. 1	10 60@10 85	Malleable Bessemer	10 75@11 00
South'n Coke No. 2	10 35@10 85	Coke Bessemer	11 50@12 00

BARS.—Another meeting of the bar iron men is to be held in Chicago on Wednesday of this week, and it will be the effort at that time to do something to insure higher prices. Sales in the last week were for the most part at the old quotations, although some mills are making a stand to secure more money for their product, and have been successful to some extent. The business of the week made a very good total, and included several orders of quite large size. One contract for 2,000 tons was placed by a wagon manufacturer. The demand continues good, and with most mills sold up well into the future, the time is regarded ripe for securing higher prices for their output, if some general agreement can only be reached. Quotations in the meanwhile are maintained at 1.05c to 1.10c for common iron; 1.10c to 1.15c for guaranteed iron, and 1.10c to 1.15c soft steel bars, strictly billet stock.

CAR ORDERS.—While no large single orders for cars have been placed in the week, the aggregate has been quite large, and the demand for car material is keeping up. Sales of considerable amounts of material were made last week on account of car orders placed previously.

RAILS AND TRACK SUPPLIES.—There is a good demand for rails of all kinds, and further sales have been made in the week. Quotations are unchanged, as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.20c to 1.30c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.60c to 1.65c.

BILLETS AND RODS.—The demand for billets and rods keeps up, and the local mills have turned away orders in the week. They are now full for some time in the future, and are only

taking such small orders as they are able to work in. Prices are unchanged at $17.50 for billets and $23.50 for rods.

STRUCTURAL MATERIAL.—A contract for about 3,000 tons of material for track elevation was given to the American Bridge Co. last week. This will undoubtedly be followed shortly by further contracts of the same nature, as there is a large amount of this work to be done the coming season. Aside from this, however, no large contracts are expected to be given out right away. General business in small lots is good, orders keeping pace with shipments every week. Quotations are made as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.15c to 1.25c; plates, 1.15c to 1.20c; tees, 1.35c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—There is active business in plates, orders going as large as 2,000 tons. The demand is heavy, and further orders are pending. Prices are as follows: Tank steel, 1.15c to 1 20c; flange steel, 1.40c to 1.45c; fire box steel, 1.85c to 5c.

SHEETS.—The demand shows some increase, and sales last week were slightly in excess of those of the week previous, including several good sized contracts. Quotations are made at 2.10c to 2.20c for No. 27 black and 80 and 10 per cent discount for galvanized.

MERCHANT STEEL.—A few large contracts have been made and further business of this nature is to come up this week. The mills are looking for a very large business this spring. Prices follow: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.45c to 1.50c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—The shortage in cast scrap appears to be growing rather than diminishing. The demand is heavy, and few buyers are getting all they want. Dealers are scouring the market. Other grades of scrap are unchanged, and there is a good demand for most of them, with stocks none too large. Dealers' selling prices are as follows:

Old iron rails, gross,	$12 00@$12 50	Axles, net	$14 00@$14 25
Old steel rails, long, gr.,	10 50@ 11 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 25@ 9 50	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	11 00@ 11 50	Axle turnings, net	7 25@ 7 50
Railroad forge, net	12 00@ 12 50	Mixed steel, gross,	..... 7 00
Dealer's forge, net	9 50@ 10 00	Stove plates, net	6 00@ 6 25
No. 1 mill, net	7 50@ 8 00	Heavy melting steel, gr.	8 00@ 8 25
Heavy cast, net	8 50@ 9 00	Old iron splice b., net.	13 25@ 13 75
Malleable cast, net	8 00@ 8 50		

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
807 TRADESMEN'S BUILDING, Feb. 9.

The purchase of upwards of 100,000 tons of Bessemer iron, the bulk of which comes to Pittsburg, is responsible for a jump in iron and stronger prices in billets and sheet bars. The January records of Pittsburg finishing mills have proven much heavier than anticipated, outputs, in notable instances, being the heaviest on record. Present buying of rolled products is healthy but characterized by small individual orders.

PIG IRON.—Upwards of 100,000 tons of Bessemer iron have been bought in the last ten days and the quotation of $9, valley, of a week ago has given place to $9.50 on prompt iron. Of the total tonnage sold, about 75,000 tons was taken by the leading Pittsburg interest whose entire wants have been supplied for some time by its own furnaces. The prices secured are said to range from $9.75 to $10.15 delivered in Pittsburg, shipments on a part of the iron running through the third quarter. Other buyers have since taken smaller lots. Lorain is credited with buying about 15,000 tons for the second quarter for which it is reported $9.50 valley was paid, and Chicago is also credited with purchases. Iron for February and March is now quoted at $9.50 valley with $9.75 and $9.85 asked on deliveries running through May. Some low sales at low fidures are reported in foundry irons, less than $10 having been accepted for No. 2. Gray forge is reported as selling below $9. Quotations are made as follows:

Bessemer, first quarter valley	$	to	$ 9.50
Bessemer Pittsburg	10 00	to	10.15
No. 1 Foundry	10.50	to	10.65
No. 2 Foundry	10.00	to	10.25
No. 3 Foundry	9.75	to	10.00
Gray Forge	8 90	to	9.00

BILLETS.—Steel is stronger since the buying of pig iron and mills are firm in asking $15 at maker's mill. Late in the week sales were reported at $14.75 and $14.85, but $15 to $15.25 is now quoted. Inquiry is heavier—particularly in the East.

SHEET BARS.—Sheet bars also are higher and nothing less than $17 is quoted. Mills ask $17 to $17.25.

RODS.—Rods are quoted at $23 and $23.50 maker's mill and are very scarce.

STRUCTURAL MATERIAL.—The agreed prices on shapes are ruling firmly on new business. Beams 3 to 15 inches are quoted 1.15c; 18 to 24 inches, 1.25c; zees, 1.15c; tees, 1.20c. Universal plates are active enough to command 1.10c at mill. The amount of new business is heavier than is apparent because orders are of small size. January, in point of tonnage, was far ahead of January 1897 but at the same time was noticeable for the lack of large work. Mails for two weeks have been heavy.

PLATES.—Railroad specifications for boiler, tank and firebox plates are unchecked. The January tonnage of local mills was a surprise, when footed up, as the month seemed a dull one. The aggregate proves to have been but little below December—the heaviest month of 1897. Mills quote: Tank, 1c; shell, 1.10c; flange, 1.20c.

FERRO-MANGANESE.—Domestic ferro 80 per cent is quoted at $46 50 and $47.

SPELTER.—Sales of spelter were heavy and transactions are reported at $3.95. We quote $3.90 and $3.95.

SHEETS.—The more hungry sheet mills covered well ahead during the low price period of ten days ago, and no more 1.90c and 1.95c quotations on No. 28 are to be had. Sheets to July are firm on a basis of 2c for No. 28 and individual mills are asking 2.05c. The big bulk of business is in light gauges and as the rolling of a certain tonnage of heavy gauges is necessary to economical mill operation, heavier sheets, such as Nos. 22 and 24 are offered at easier prices. Some corrugating concerns have covered during the week. Galvanized sheets are active for the present and 80 and 5 per cent is the quotation.

RAILS AND TRACK MATERIAL.—The rumor that the Carnegie Steel Co., Ltd., has abandoned its intention of rolling girder rails at Homestead is untrue. The L. & N. order for 15,000 tons of T-rails referred to last week, has finally been closed and will be rolled at Edgar Thomson. A number of other attractive rail orders are pending. T-rails are firm at $18, Bessemer, and pool rates are said to be in force strictly. On track material we quote as follows: Iron track bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.20c.

PIPES AND TUBES.—The 75 mile pipe line order from Indiana reported last week as closed has not been formally awarded, but will doubtless go to the Wheeling district mill that made the lowest bid. Pipe mills talk encouragingly of the current business but are unable to report any change for the better in prices. Old base discounts are quoted again as follows: Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld galvanized, 50 per cent off; lap weld galvanized, 55 per cent off. The additional discounts are 6 tens on small lots and 6 tens and 5 per cent on attractive orders. Discounts on merchant boiler tubes are as follows: 2¼ inch and smaller, 72½ per cent off; 2½-inch and larger, 75 per cent off.

OLD MATERIAL.—Local sales were made at the first of the month by railroads, the material including both iron and steel rails, the former at $14 and the latter at $10.50. A difference is noted between these prices and the asking prices of those holding stocks. For steel rails $11.50 is asked and $14.50 and $15 for iron, and the heavy inquiry does not tend to bring the two sets of prices closer. Cast scrap is quoted at $9.25 to $9.50, No. 1 wrought at $12, net; car wheels, $10.50 to $10.75, gross.

CLEVELAND.

Office of *The Iron Trade Review*,
27 Vincent St., Feb. 9.

The favorable turn in the pig iron market is likely to bring iron ore plans to a head sooner than was indicated by the attitude of the ore producers' committee up to the present week. Questions of ouput are believed to be quite well decided upon, and after the meeting of Bessemer ore producers, appointed for Saturday, it is probable that all that will stand between the trade and a perfected schedule of prices for old-range Bessemer ores will be the laborious calculations required to arrive at the price of each ore, based on the average of its analyses for 1897. There is no reason for modifying the statement heretofore made that the Mesabi range will not be represented in the association of 1898 and that the advance in price will be 15 to 20 cents for standard Bessemers. Non-Bessemer ores

will doubtless take about the same position as in the last season, with such addition in price as will compensate for the increased cost of mining. There was scant margin on these ores last year and only those most cheaply won and carrying low royalties will show any satisfactory balance to the good in 1898. It is understood that the Illinois Steel Co. has been negotiating for its Mesabi ores for this year, and has made its selection in part. Prices on the most desirable Mesabi grades are expected to carry the advance over 1897 that may be made in association ores and something more, it being recognized that the spread existing last year was quite too large in some cases.

PIG IRON.—From the extreme of depression the market for Bessemer pig iron rebounded in a surprising way to a figure that means a profit on 1897 mixtures. Buying began on Thursday of last week and in two days large blocks of iron were picked up, all of it for prompt delivery. It is believed that fully 100,000 tons has been bought, the bulk of it going to Pittsburg. The low price touched in one or two sales of last week, where iron had to be disposed of to make piling room, or for some other reason, was $9 in the valley. Sales were made at $9.10, $9 20 and at other intermediate figures, until $9.50 was reached for prompt iron, in the valley. Sellers have recovered their confidence, under this phenomenal turn, and the enormous output of Bessemer steel, of which it is an index, has made firmer quotations for later deliveries, $9.75 being asked for second quarter. Foundry iron is unchanged by the spurt in Bessemer. A slack Eastern market has had its effect on Central Western trade. It is believed the recent concessions are not repeated now and that the attitude of Southern sellers will strengthen the situation. The usual valley quotation is now $9 25 for No. 2. Forge iron is somewhat more freely offered, and is delivered at valley mill at $8.50. Lake Superior charcoal has been active under the attractive offers of certain furnaces, some of which are disposing of stocks without expectation of running again. We quote Cleveland prices:

Bessemer	10 15@10 40	Valley Scotch No. 1	$10 40@10 65
No. 1 Strong Foundry	10 40	Valley Scotch No. 2	9 90@10 15
No. 2 Strong Foundry	9 90	Gray Forge	9 00
No. 3 Foundry	9 40@ 9 50	Lake Superior Charcoal	11 50

FINISHED MATERIAL.—A feature of current business is the freedom with which buyers are sending in specifications. In agricultural lines this is especially noticeable. Car works are very busy, and most bar mills are booked two and three months ahead. Yet prices do not improve and the meeting of Western bar iron manufacturers appointed for this week is postponed pending an effort to get mills generally into the movement. Steel bars are at unchanged prices, Cleveland deliveries being quoted 1.03½c, equivalent to 95c Pittsburg, which competes with a valley price of 1c on bar iron, equivalent to 1.04c Cleveland. On some closely contested orders, good specifications, these figures were shaded a trifle recently. Plates and structural material are quiet for the moment. Sheets are fairly active and mills are quoting enough higher to answer to the increased firmness in steel. Old material maintains the recent improvement. Inquiries for cast scrap have been received in this market from Western points, an unusual thing. The present quotation is $8.25 to $8.50. For No. 1 railroad wrought, the market is $11.75 to $12; old car wheels, $11.25; old iron rails, $13.50 to $14; old steel rails, $10.50.

CINCINNATI.

February 9.

Ten days ago the situation as to pig iron was decidedly shaky, and it looked as if the increasing demand was resulting in lower prices, especially for Southern brands. There was such an eagerness on the part of a few sellers to get some desirable orders that prices were cut about 25 cents per ton. Rumors have been afloat that the largest producer in the South had decided to meet competition, and had in consequence taken a great volume of business. The fact is said to be that about two weeks ago the company named found itself in need of some orders for gray forge and No. 4 foundry, and in order to obtain them made a slight concession on those grades. The large transactions of the last week of January caused alarm among leading producers in the South, for they saw that if this course was continued by even a few it would soon result in a demoralization of prices that would force quotations back to less than cost. The effort now is to establish a minimum of $7.25 for No. 2 foundry and $6.50 for No. 4 foundry. Current transactions show a steadying of the market and the volume is certainly satisfactory. A meeting of Southern iron masters in Birmingham this week is the occasion of a good deal of interest. The meeting will no doubt throw light on the Southern situation and it is believed by many will tend to put more firmness in the market. Lake Superior charcoal is still active. Some furnaces, it is reported, will not operate until conditions are more favorable. They are now closing out their stocks of iron at best prices obtainable, and there is fierce competition in that class of material. Buyers are not slow to avail themselves of the attractive offers being made, for it is thought to be only a question of a short time before quotations will be advanced to living figures. We quote, f.o.b. Cincinnati: Southern coke, No. 1 foundry, $9 75 to $10; No. 2, $9.50; No. 3, $9.25; gray forge, $8.75 to $9; mottled, $8.75; No. 1 soft, $9.75 to $10; No. 2. $9 50 to $9 75; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co. silvery, No. 1, $12.50 to $13; Standard Georgia car wheel, $14.25 to $15. Bar iron and sheet mills report order books quite well filled In bar iron and steel the volume of business in the West is large, and the surprising feature of the trade is that prices should not have improved, with mills so well occupied.

PHILADELPHIA.

February 8

The volume of pig iron production has been telling on the market of late. With all the signs of activity that appear at mills and engineering works, a production of a million tons of pig iron a month is putting the consuming capacity of the country to a severe test. Whether the low dip of prices in the past few weeks is the extreme of depression that often means a reaction, it would scarcely be wise to say, but by some it is so construed. It can be understood why there is such a crowding of mills and furnaces and why some producers are so eager for business even with several weeks of orders ahead. There is no chance of money-making on to-day's basis unless the top notch in tonnage can be reached. The belief grows that our export trade in iron and steel will be permanent; and if it should increase as it is natural to expect, there will be a steady outlet for any surplus that under the present relation between home production and consumption would always prove a drag on the home market. The pig iron market the past week has been dull. The shipments from Pennsylvania and Virginia furnaces into New England and New York seem to have slackened somewhat, and there is an impression among some foundrymen in dstricts tributary to this market that works farther West have been getting business at their expense. For the present buyers are showing no interest; but sellers are hoping for some improvement, in sympathy with the reported movement in Bessemer in Pittsburg, and under the more direct influence of the expected action of Southern iron producers establishing minimum prices. The volume of business in pig iron is good, measured by ordinary furnace operations, but the supply is unprecedented, so that the range of prices is substantially as quoted heretofore—$12 and a shade under, for No. 1X foundry; $10.75 to $11 for No. 2; $10.50 for No. 2 plain; $10 for standard mill iron; $10.25 to $10.40 for basic. The demand for rolled products keeps up, though bar mills are not so well employed as those turning out plate and structural material. A 2,000-ton bridge for the Pennsylvania Road has been let and the ship yard work of last week is thought to have brought a shade better price than the last considerable purchase—about 1.10c for hull plates, or 50c a ton above the lowest in January. We quote beams and channels at 1.30c, up to 15 inches; bars at 1.10c; tank plates, 1.15c; angles, 1.20c to 1.25c.

Sheet Manufacturers Meet.

The Association of Iron and Steel Sheet Manufacturers held a routine meeting on Tuesday, at the office of Secretary John Jarrett in the Conestoga Building, Pittsburg. The representation of mills was large. Two session were held, the time being devoted to a general conference. No important action was taken. It appeared from the reports of members that demand is good and that mills are busy, with a somewhat firmer tendency in prices.

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C. H. GARDNER, President. A. I. FINDLEY, Editor.

CHICAGO:
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FEBRUARY 10, 1898.

SUNDAY WORK IN STEEL MILLS.

Ceaseless crowding for tonnage under the stress of low prices and the necessity of bringing every part of a plant up to its highest possibilities of output, is raising one question that may be of larger import than appears at first thought. The announcement was made a few weeks ago that a large steel company had asked its men to work a Sunday turn so that better deliveries might be made on steel for which buyers were urgently calling. The inference was carried that the arrangement was not to be permanent, but to tide over a time in which unusual deliveries must be made. The employes were unwilling to do Sunday work, the Amalgamated Association having steadily opposed it, but finally agreed to start in Sunday night at 12 o'clock, instead of 6 o'clock as proposed, and to prolong Saturday work to 10 o'clock P. M., or five hours beyond the old time. It is now stated, however, that more than a temporary arrangement is desired, and that the question has been up again the past week, President Garland having gone to Chicago to represent the men.

It is a fact that at some Pittsburg steel mills Sunday work has been the order for several years. In one case there is a Sunday night turn, beginning at 6 o'clock in finishing mills, the blooming mill starting two hours earlier. In another mill Sunday night work begins at 9 o'clock. The Amalgamated Association, which has always opposed Sunday labor, lost its hold on the one establishment some years ago, and has not been influential with the other for a year or two. No doubt the Western move for Sunday work has been in part the result of the larger encroachment upon the day in Pittsburg mills.

We sympathize heartily with the position of the men on this matter. It is to the credit of the Amalgamated Association that it has never allowed the desire for gain to shake its decision to stand for the preservation of the workingman's rest-day. Apart from the ethical question involved, all resistance of inroads upon the first day of the week is commendable because it helps to establish for every other workingman the right to the undisturbed enjoyment of Sunday privileges. It will be a sorry day for our country when commercialism shall so far dominate, that the rights of men and the common obligation to higher laws than those made by competition and the demands of clamorous customers, are forgotten.

ONE SIGN OF THE TIMES.

What we may now fairly call "the late" hard times, have been specially noticeable (in my opinion) in the matter of "the cleaning out of dead wood." During the flush times preceding, every owner of a business, or stockholder in a company, seemed bent on getting a "soft thing" for himself, or his son, or daughter, or nephew, or somebody. While things were humming, business could *apparently* stand this sort of thing, but I am getting to think more and more that this very thing was a very important factor in the final wreck.

I think that during the year 1897 there has been more clearing away of this dead wood than ever before; concerns have realized what was wrong and acted accordingly.

It has come to this: That no legitimate business can stand paying salaries to people who do not earn them, the reason being that the tendency of the times is towards smaller profits and a smaller interest rate. Just what the final result is to be is not proper to be discussed in this paper, but certain it is that business can no longer be profitably conducted in the old easy family way, and those concerns who start out now resolved to steer clear of this particular rock will, I think, be the ones to weather the next storm.

I have noticed so much of this clearing away lately, and in many cases where I knew that it was just and proper, that I am beginning to wonder how many cases of so-called injustice are not really strict justice after all. SCRUTATOR.

A QUICK TURN IN BESSEMER IRON.

The picking up of 75,000 tons of Bessemer pig iron by the leading Pittsburg interest at prices all the way from $9 to $9.50 at valley furnaces, comparatively little of the metal bringing the latter figure, was certainly a clever piece of buying. Recent market transactions had put furnacemen in such a frame of mind that the way was prepared to the buyer's liking. The destination of the metal was not known until the entire amount had been covered. It has been understood in a general way for several months that consumption of Bessemer by large steel producers was greater than their own production, but how well the tremendous output of finished material would be maintained was the question. In the days before the Duquesne furnaces the source of any considerable demand for Bessemer pig iron was readily guessed. Latterly the feeling that Pittsburg demand for valley metal had passed into desuetude put the furnacemen off their guard. The transactions of the week recall the heavy buying by the same interest in March, 1895, when 100,000 tons of iron, largely for future deliv-

ery, was taken up. These purchases and the advance in coke wages that followed, the establishment of an ore pool that put the price of Norrie at $2.90, and later the advances in furnace wages, were all steps in the memorable activity of 1895. There will be no repetition of that history in 1898, but the incident of the past week suggests how prodigious is the present consumption of finished steel. In connection with the week's buying the following extract from our pig iron review of one week ago is interesting, merely as a coincidence, but not in any sense as an attempt at prophecy:

> What is wanted is a buying movement involving 75,000 or 100,000 tons of metal. If, with their enormous present consumption of pig metal, one or two of the large steel companies should find it necessary to make a moderate purchase of iron for the second quarter, the situation would not be long in changing for the better.

That prompt iron was taken rather than second quarter metal, is that much better from the seller's standpoint. Unless expectations of 1898 are to be disappointed the second quarter will make it possible for pig iron producers to get a better margin than was realized in any of the sales of accumulated iron in the past week.

ILLINOIS STEEL CO. ANNUAL MEETING.

(Special Telegram.)

CHICAGO, Feb. 9.—The ninth annual meeting of the Illinois Steel Co. was held here to-day, the only business transacted being the election of officers and reading of president's report. The election resulted in only one change, Elbert H. Gary being substituted on the board of directors in place of Isaac L. Ellwood. President Gates' report showed that over 1,100,000 tons of pig iron and spiegeleisen were made last year, and about 1,000,000 tons of finished product. The large output was accompanied by moderate prices, and compelled the company to seek foreign markets for the surplus product.

Shipments were made last year to every continent and nearly every country in the world. During the year the condition of all plants has been well maintained. Large sums have been spent in betterments and new construction, all of which were charged to expense, and no increase made in plant account. During the coming year the company contemplates finishing and building auxiliaries to the open-hearth and plate mills at South Chicago, and completing the Joliet plant. The coke, ore and railroad properties of the company have been well maintained, and are showing good results. The company began the year with a large inventory of materials and supplies on hand, which now shows a large reduction and stands at low prices. Order books are well filled at prices which will show a fair margin of profit. An item of $1,200,000 was transferred from accounts receivable to 5 per cent first mortgage gold bonds, which are now in the company's treasury. It was necessary to write off a large amount on account of depreciation in prices of raw materials, bought in previous years, but the large deficit shown Dec. 31, 1896, has been overcome, and the company now has a small surplus.

The condensed balance sheet of the company, Dec. 31, 1897, was as follows:

ASSETS.

Plants	$19,920,945
Investment in railroad bonds and stocks	3,830,000
Investment in coke property	2,781,000
Other investments	408,366
Materials and supplies	2,710,521
Cash	1,002,189
Bills receivable	580,898
Accounts receivable	4,220,409
Total	$35,714,340

LIABILITIES.

Capital stock outstanding	$18,650,635
Five per cent debenture bonds due in 1910	6,200,000
Five per cent debenture bonds due in 1913	7,000,000
Dividend scrip outstanding due in 1913	85,142
Bills payable (since reduced to $1,215,000)	1,630,000
Accounts payable	1,985,451
Reserve funds	142,478
Profit and loss (surplus)	20,625
Total	$35,714,340

Lake Superior Iron Mines.

Receiver Thos. M. Wells, of the Escanaba River Land & Iron Co., has sold to Tod, Stambaugh & Co., of Cleveland, the Swanzy mine at Swanzy, Mich., and other property of the company. A confirmatory order has been made by the court. The property sold embraces the southeast quarter of section 18 and the northwest quarter of section 20, town 45, range 25, Marquette county, and personal property thereon. The contract price was $85,000, payment to be made in installments, the last of which shall fall due November, 1899. There are 175,000 tons of ore in sight, about half of it being Bessemer. Analysis of the Bessemer ore shows 66 and67 in iron and about .045 in phosphorus. The mine will be actively wrought the coming season and work has begun, under Capt. John Thomas. It is probable that 75,000 to 100,000 tons of ore will be taken out in 1898. Some new equipment will be purchased as soon as the new company organizes.

The Shores mine on the Gogebic range, which was shut down last year owing to some unsettled questions relating to royalty and the company's finances, will be worked for 60,000 to 70,000 tons output this year. The ore is one of the most desirable on the range, analyses for 1896 averaging 65.23 in iron, .029 in phosphorus, with 7.50 moisture. Tod, Stambaugh & Co. are the sales agents

Following the raising of wages at the Norrie and Tilden mines an average of 10 per cent, a similar advance is announced by the Newport Iron Mining Co., dating from Feb. 1.

The Minnesota Iron Co. has put a force of 75 men at work at the Norman mine. At the Elba property of the company shaft sinking is going on rapidly. The Genoa is working 225 men. At the Fayal, a new working shaft, located on fee lands, is about completed. It is estimated that the Fayal will have 400,000 tons of ore in stock by May 1.

The Brotherton mine at Wakefield, Mich., active only three months in 1897, will be worked again. The scale of operations will depend on the settlement of royalty questions. The ore is of excellent quality, but there is much water to pump. Joseph Sellwood has just been re-elected president of the company.

Personal.

M. A. Neeland, chief draughtsman at the Duquesne Steel Works, has resigned to accept a position with the Ohio Steel Co. at Youngstown, O.

C. A. Schwab, president of the Carnegie Steel Co., Ltd., passed through London, Jan. 23, a London exchange says, en route to Cannes, where he will visit Andrew Carnegie.

Sir Henry Bessemer received congratulations on his 86th birthday, Jan. 19. He is still able to be about, but his strength has suffered some decline since the death of Lady Bessemer last year. He continues to reside at Denmark Hill in the suburbs of London, having occupied the same residence for more than 25 years.

Randolph S. Warner, secretary and treasurer of the King, Gilbert & Warner Co., Columbus, retired from active management of the company's plant, last month, and will give his attention to some private interests. He is succeeded in the board of directors of the company by N. Martin Peterson.

J. W. Gardner, manager of the Chicago office of Manning, Maxwell & Moore, resigned that position on Jan. 1, to go with the Stirling Co., boiler manufacturers, Pullman Bldg., Chicago. Mr. Gardner's large acquaintance and his popularity will make him a valuable acquisition to the Stirling Co.

O. B. Shallenberger, president of the Colorado Electric Power Co., and consulting engineer of the Westinghouse Electric & Mfg. Co., died at Colorado Springs, Jan. 23, of consumption. Mr. Shallenberger was an inventor of considerable note, and for a number of years had been connected with the Westinghouse company.

CARBON AND STRENGTH OF IRON.

BY GUY R. JOHNSON.

I have read with a great deal of interest the paper of Major Malcolm McDowell, which was recently read at the Western Foundrymen's Association. Maj. McDowell 's paper is very valuable, and the writer thoroughly agrees with him in saying that "iron should be bought and sold by chemical analysis." Granting, however, that iron should be purchased by chemical analysis, Maj. McDowell's views should have been expressed somewhat as follows: "In justice to both furnace and foundrymen, pig iron should be bought and sold by analysis, meaning by 'analysis' to include the carbons, as well as the usual silicon, sulphur, phosphorus, and occasional manganese."

As a matter of fact, the carbons would have to be included in the analysis of pig iron, if the iron were bought solely by chemical analysis; and still we should not have enough data to enable us to judge accurately of the characteristics of the iron. I am not saying this to discourage those who wish to see the foundrymen's business put on a more rational and scientific basis; on the contrary, I believe in such efforts, and have done what I could to help them along, being the manager of one of the furnaces to which Maj. McDowell refers, which make and sell foundry iron on analysis. I have found, however, that analysis will not do entirely; i. e., there is unquestionably so much influence exerted by the physical workingof the furnace on the result of pig iron that it is necessary not only to have analysis, but also, for special work, to have the grade added. For instance, an iron for strong machinery castings, should analyze, according to the writer's experiments, about:

1 to 1¼ silicon.
.35 to .50 phosphorus.
.75 to 1 per cent manganese.
.03 to .05 sulphur.

Suppose, however, that this iron be made with the furnace working very hot, and consequently producing a graphitic iron, i. e., No. 1 or No. 2 iron. Does Maj. McDowell think that such a graphitic iron would give as strong castings as a No. 3 or gray forge fracture? i. e., an iron higher in combined carbon? If he does, his experience is totally at variance with that of the writer.

It seems to the writer that, while Maj. McDowell has given us some noteworthy results, he misses the main point when he attempts to explain the great strength which he arrives at in some of his castings. Take, for instance, his No. 1, which gives a total strength of 49,000 pounds to the square inch:

Combined carbon, .93.
Graphitic carbon, 2.19; total carbon 3.12.
Silicon, 1.34.
Phosphorus, .08.
Manganese, 1 per cent even.
Sulphur, .003. (Should this not be .03?)

Now, let us compare them with a very similar Embreville iron, as to metalloids, with the exception of the carbons:

Silicon, 1.29.
Sulphur, .05.
Phosphorus, .17.
Manganese, .80.
Graphitic carbon, 2.84.
Combined carbon, .92; total carbon 3.76.
Tensile strength, 36,000 pounds.

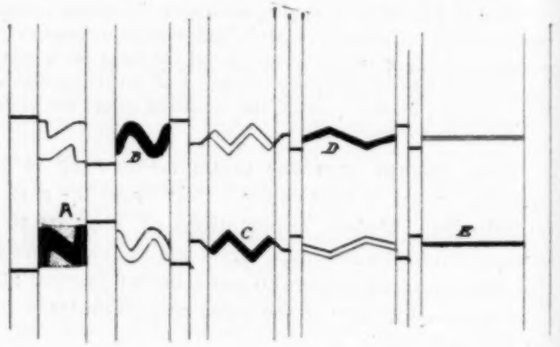
There is no large variation here, with the possible exception of the sulphur, which element has a tendency, of course, to produce combined carbon, and which would tend to make the second iron the stronger. But between the total carbon of 3.12 and 3.76, there is a very large variation, and the writer believes that this is the key-note to the strength of iron; i. e., lower your carbons, and you increase the strength of the iron; increase them and you decrease the strength of the iron. It is this reason that enables foundrymen who use an air furnace to make iron of a very great strength, because it enables them to burn out a very large proportion of the carbons, especially the graphitic carbon.

I quite agree with Maj. McDowell in his remarks on manganese, which has been a very much abused metal by many of our foundrymen. It might be recalled with profit by many of these that the famous Scotch softeners, without which, only a few years ago, many foundrymen thought they could not produce good castings, all contained from .80 to 1.25 manganese, and sometimes higher.

Embreville, Tenn.

IMPROVED PROCESS FOR SHEET AND TIN BARS.

Under a patent recently granted Joseph Guest, roll turner at the Homestead Steel Works, the Carnegie Steel Co. has employed of late rolls of peculiar shape in the rolling of tin plate bars. The improvement in the method consists in the more rapid reduction of the billet to the thickness of tin plate bars and the ability to roll more truly to the desired weight than by ordinary rolls. Some years ago Mr. Guest conceived the idea of lateral rolling on a W shape, and it was patented in 1887. In using the W-shaped pass, both edges of the bar abutted against the same roll. The plan had practically the same advantages as the Z pass, but the $2 a ton royalty asked



by those who took up the patent operated against any general adoption of the new departure.

The progression from the Z shape to the finished bar is indicated in the cut, A, B, C, D and E representing the successive passes. The dotted figure in the first pass represents a bloom or billet which in this first pass is formed into an N, Z or S shape. The rolls in the first pass are provided with a single annular projection by which a pair of non-registering grooves are formed longitudinally in the opposite faces of the metal. In the succeeding passes circumferential projections on the rolls are so arranged as to give an approximately Z, S or N shape to the metal. The passes B, C and D spread the metal laterally and the pass E forms the flat plate. Apart from the employment of the rectangular billet the process is advantageous in forcing the metal into the corners and giving a more uniform section.

England and American Competition.

Mr. W. R. Stirling, of Chicago, formerly vice-president of the Illinois Steel Co., writes as follows to the *Iron and Coal Trades Review*, London, concerning a reference in that paper to statements made by him in 1888, comparing them with statements in his paper read at London in May, 1897: "I have no apology to make for the views I held in 1888; the facts and figures then given were correct. The changed conditions of to-day are due, in my opinion: 1. To the great developments in the iron ore districts, and consequent largely reduced price for that article. 2. To the great reduction in freight rates. 3. To improved methods of manufacture in labor and other particulars. 4. To the greatly reduced consumption of fuel in blast furnaces, as well as in raising steam and in heating. 5. If I am not mistaken, to an increased instead of decreased cost of manufacture in Great Britain during the nine years that have elapsed. 6. To the extreme conservatism of British manufacturers and working men, who apparently cling to old methods instead of stimulating new inventions and labor-saving devices that would increase the product, decrease the cost, and retain their markets.

"Iron ore, coal and coke, owing to the use of much larger vessels and cars, and to improved methods of handling, are transported in the United States at so much less rates in 1897 than in 1888, as to largely account for the changed trade conditions, to which you call attention."

THE Duff Patents Co., 924 Carnegie Bldg., Pittsburg, Pa., has recently received orders for its patent water seal gas producers from the Bellaire Steel Co., Colorado Fuel & Iron Co., Phœnix Horse Shoe Co. and the American Tube & Iron Co. From the number of inquiries on hand the company regards the prospect for 1898 as very bright.

IS MANGANESE A METALLOID?

BY ALEX. E. OUTERBRIDGE, JR.

The modern scientific literature on the subject of cast iron is assuming such important proportions that it would seem very desirable to prevent erroneous terms from creeping into it and becoming established therein.

It appears to be the universal custom of such writers to day to assume that all of the elements found in cast iron, except the iron are "metalloids," not metals. It is, therefore, I think pertinent to ask, What are metalloids? According to the classification of Berzelius, one of the great fathers of chemistry, the term metalloid is strictly limited to "inflammable, non-metallic elements." Manganese clearly does not come within this definition, for it is not inflammable, and it is a metal. One of the accepted distinctions of chemists between a metal and a metalloid is that of "specific gravity," the metalloids being of very low specific gravity, while the metals, as a rule, are comparatively dense. Manganese is heavier, bulk for bulk, than cast iron, and in all chemical classification with which I am familiar, it is known as a metal, never as a metalloid. When alloyed with copper, in the form of "manganese bronze," the manganese still remains a metal, and even when alloyed with iron, in the form of "ferro-manganese," it is recognized by metallurgists in all steel works as a metal. Yet, by some strange and inexplicable process, this same metal manganese, alloyed with iron (ferro-manganese) when powdered and melted in a ladle of cast iron, or even when melted in a cupola with the pigs, loses its identity as a metal and becomes known to the foundryman or to the foundry chemist as a metalloid! By what authority has the change been made?

The most liberal classification known to chemistry includes 13 metalloids, but manganese is not of the number; they are as follows: Oxygen, hydrogen, nitrogen, chlorine, carbon, bromine, iodine, fluorine, sulphur, selenium, phosphorus, boron and silicon.

It will be observed that silicon is included in this list, but I am prone to believe that it is more likely to be regarded in a future classification as a metal. Ferro-silicion, for example, is a metallic alloy of iron and silicon, having high specific gravity and a high melting point. Until recent years silicon had not been isolated and even yet but little is known of its properties.

The chemist invariably makes his return of silicon in cast iron by subtracting the proper equivalent from the weight of silicic anhydride (SiO_2) found in his platinum crucible after burning off the carbon. If the weight of the SiO_2 found is equal to, let us say, exactly two per cent of the cast iron, he reports the silicon content as 0.93 per cent (or to be precise, 0.93334 per cent).

While I do not presume to criticize the accepted classification of silicon as a metalloid, I feel quite confident that chemists will agree with me, when the matter is called to their attention, that manganese is not a metalloid and should not be classified as such in foundry or other chemical literature.

Philadelphia, Pa.

Malleable Cast Iron.

An English exchange says: "Although malleable iron, under certain conditions, might fairly be classed as unreliable, it is a well-known fact that its irregularity has increased since old annealed scrap has found its way into the charge. While this innovation has undoubtedly cheapened the product, it has made the work of the molder more uncertain, for its influence on the fluid iron seems to render it more liable to give trouble from blowing, honeycombing or cutting the mold; and to overcome these evil developments the resources of the molder are taxed to their fullest extent. On the other hand, many advantages can be claimed for it, and as its usefulness and serviceability become better known and understood, new fields are ever being opened up for it, and it seems as if malleable cast iron were destined to play a still more important part in the iron industry of the future."

A LONDON cablegram says that Millard Hunsiker, London representative of the Carnegie Steel Co., has gone to St. Petersburg to close steel rail contracts.

FOUNDRY USES OF THE BLOWER.

At the January meeting of the New England Foundrymen's Association a paper on "The Uses of the Blower in the Foundry" was read by Walter B. Snow, of Boston. Under the term "blower" Mr. Snow classed four types of machines: 1. The peripheral discharge fan wheel with enclosing case. 2. The propeller or disc wheel, discharging its air in lines practically parallel to its axis. 3. The so-called rotary blower with close fitting revolving propellers, and 4. The blowing engine, acting upon the principle of the plunger pump, and capable of producing pressures of several pounds to the square inch.

"Of these four types, the second, or propeller type, is absolutely valueless for cupola work, because of its inability to produce the required air pressure; while the fourth, or blowing engine type, is too complicated and expensive for use in the ordinary foundry. For all purposes, except blowing cupolas, the fan blower is the only type which is adaptable. Although the rotary blower is to a certain extent employed for this specific purpose, a clear statement regarding the theory and operation of the fan blower, such as it is here attempted to make, should render evident the predominant advantages of the latter type."

The writer then discussed the operation of the fan blower, as designed for volume and for pressure of air. The construction for each purpose was described and formulas derived, showing the theoretical relation between the revolutions of a fan and the volume, pressure and horse-power. It was demonstrated that if the speed is doubled the volume is also doubled, the pressure is increased four times and the horse-power becomes eight times greater. Following this presentation of the theoretical features of design and operation, Mr. Snow considered the different types of fan blowers employed in the foundry from the standpoint of practice. This portion of the paper is given below:

First of all is the pressure blower, for blowing the cupola, so familiar to you in the form of the Sturtevant steel pressure blower. The extreme length of the bearings and the special arrangement for keeping them well supplied with oil are among the most important features which have made possible the continued employment of blowers of this make for fully a hird of a century with practically, and, in many cases, with absolutely no expense for repairs. The fan wheel is narrow, with tapering sides, reducing to the minimum width at the outer circumference where the air escapes from the wheel into the surrounding case. Numerous curved blades or floats serve, by their continuous action, to prevent the return of this air to the wheel center, and thereby maintain the pressure due to their tip velocity. From what has previously been said, it must be evident that even a slight change in the width of the tip of the blade of such a narrow wheel must have a marked effect upon the volume of air which is discharged and upon the power which is required to accomplish this result. For this reason blowers cannot be compared by the areas of their casing outlets, but only by their capacity areas, as determined by the proportions of the wheels.

The general application of a pressure blower to a cupola is too well known to require description; but certain features which relate to its efficiency may well be considered here. The proportions of a pressure blower wheel should theoretically be such that its capacity area or square inches of blast shall be practically equal to the free area through the fuel and iron in the cupola, less the influence of the resistances of piping, tuyere boxes, fuel and iron. These resistances are evidently the equivalent of just so much reduction in area, and must therefore enter into any consideration. But it is manifestly true that differences in the length and arrangement of piping in different plants, and of size, quantity and character of the charges in the same plant, introduce such variable conditions that it is impossible to design a blower of any type that shall at all times be just exactly proportioned to the work to be done. For this reason the exact power required to operate any given blower cannot be given as an absolute quantity, but can only be determined when all of the conditions are known.

It is, or at least it should be, customary in specifying the pressure required to operate a cupola, to refer to that in the wind-box. On the other hand, the table of blower speeds

presented in the Sturtevant catalogue gives the number of revolutions necessary to produce the given pressure at the fan outlet when its area is within the capacity of the blower. owing to losses due to transmission, this pressure cannot be maintained at any more or less distant point, such as the wind-box of the cupola, unless the speed of the fan is increased sufficiently to produce an excess of pressure equal to the transmission loss.

It is the failure, on the part of the purchaser, to comprehend this fact, and to make due allowance for transmission losses, that sometimes results in too low a pressure at the cupola, and an unjust charge against the blower. Large, straight and short connections from blower to cupola are always imperative if waste of power is to be avoided. If changes in the direction of the piping are necessary, they should be made with as large a radius of curvature as possible. It should be distinctly understood that the power required to operate a fan blower is proportional to the area of discharge. If this area be reduced to zero, by the closing of the blast gate, the power will be reduced to merely that due to the friction of the machine and of the air confined within the case. Too often it is claimed, by those who ought to know better, that closing the pipe increases the power; but, as power is expended only when air is moved, the fallacy of this statement is evident.

This fact points to one of the prominent economic advantages of the fan blower, viz.: its automatic action. Instead of always delivering a fixed volume of air, regardless of requirements, the fan blower automatically increases the volume as the resistances are decreased. On the other hand, if the fan blower be in operation with a fairly free outlet, in excess of its capacity area, and that free area be decreased, the pressure produced by the fan will immediately rise, thus tending at once to overcome the increased resistance. Therefore, if a certain maximum pressure is known to be required in a given cupola, the fan may be so speeded as to give this at such times as the conditions demand; while at other times, when less pressure or volume of air is required in the cupola, proper manipulation of the blast gate will economize power. Compared with a type of blower, like the rotary, in which a certain maximum pressure and volume must always be maintained, and a portion allowed to waste if not required, the economic advantage of the fan blower is evident.

Although it has already been stated that this paper does not attempt to draw comparisons with the rotary blower, it is impossible to make clear certain advantages, such as the above, without considering their relations. This is also true in the consideration of the following points. In the matter of first cost the fan blower is, for the same capacity, only about one-quarter as expensive as the rotary blower, and weighs on the average only about one-ninth as much. This latter feature is of the greatest importance, particularly in the case of large plants; for with the fan blower expensive foundations and high freight charges are avoided, while the handling of parts for repairs is rendered far easier. In the matter of efficiency under the same conditions, the fan blower has been shown by impartial experiment to be superior, while in general endurance, in lack of danger of breakage and of leakage due to wear, it may be fairly claimed to take the lead.

We may now turn to other uses of the fan blower in the foundry—uses in which it has no practical competitor. Employed as an exhaust fan, and properly designed for its work, it has found an extended application for removing the dust from tumbling barrels, from emery wheels, and, in fact, for exhausting dust, smoke or objectionable gases from any machine or apartment in which they are generated. For such work the fan is driven at comparatively low speed, and proper connection made to the space or spaces from which the objectionable matter is to be drawn. This passes through the fan and thence to any desired place of deposit and is discharged into the open atmosphere. In the case of the pattern shop, which usually forms an adjunct of the foundry, a fan of this type in the form of a planing mill exhauster is always of advantage for the removal of shavings and sawdust. The width of the wheel in such a fan is far greater both at inlet and outlet than that of a pressure blower wheel. A large volume of air at comparatively low pressure is thus passed through the fan with a minimum expenditure of power.

A similar type of fan on a larger scale is used in connection with a steam-pipe heater for the heating and ventilation of the model foundry. By the concentration of all the pipe in a single heater across which large volumes of air are caused to pass, the amount of pipe is reduced to from one-third to one-fifth of that which would be required if it were strung around the foundry, as in the case of direct radiation. This concentration of the heating surface also serves to reduce to a minimum all possibility of freezing, renders the regulation of temperature as simple as is possible, and presents numerous other advantages. The general form of this apparatus is shown by the accompanying cuts. The heated air is distributed by means of the fan through a more or less extended system of underground ducts with vertical wall flues or of overhead galvanized iron piping. The large quantity of air thus supplied secures adequate ventilation, causes all air leakage to be outward and serves to keep the foundry comfortable and clear of gas and steam during the heat, if cool or slightly tempered air be then supplied. A similar form of apparatus, designed to deliver air at high temperature, may be employed for keeping cores dry. It is also used for drying flask and pattern lumber, when the quantity is sufficient to warrant the arrangement.

Although the boiler plant in connection with an independent foundry is usually of somewhat limited size, nevertheless, the fact should not be overlooked that the fan blower is rapidly usurping the place of the chimney in the production of draft, or serving as its assistant in securing desired results. Applied to force the air into a closed ash pit it creates a pressure which makes possible a high combustion rate, the burning of cheap fuel, and the attainment of the maximum capacity of the boilers. Employed as an exhauster, through which the gases are drawn, it, in addition, does away with the necessity of a high chimney. Under either form of application perfect control may be maintained over the draft pressure, and it may be automatically increased or decreased coincidently with a slight fall or rise in the steam pressure, which thus remains almost absolutely constant.

Such, then, are some of the uses of the fan blower in the foundry. Either as a convenience or as a necessity it is ever in demand, and its forms of application are constantly increasing. It, therefore, stands to-day as a specific type of machine, whose general advantages and peculiar adaptability are becoming more and more familiar to every manufacturer and engineer.

THE next meeting of the Western Foundrymen's Association will be held at the Great Northern Hotel, Chicago, at 7.30 P. M., Wednesday, Feb. 16. A paper on "Mechanical Changes in Mixtures of Cast Iron," by Eugene W. Smith, will be presented. The paper read at the last meeting by Maj. Malcolm McDowell on "The Value of Metalloids in Cast Iron," created such interest that further discussion was desired, and it will again come up for consideration. Members are requested to submit other questions to be discussed at future meetings, or to furnish reports of experience and phenomena observed in their daily work.

AN agreement has been entered into between the Buliders' Iron Foundry, the Rice & Sargent Engine Co. and the Providence Steam Engine Co., of Providence, R. I., a dispatch says, by which the interests of the three companies are to be combined for the next five years. Officers of the Builders' Iron Foundry have taken charge of the steam engine companies.

THE Pennsylvania Railroad Co. has let the contract for the construction of the new bridge across the Delaware River at Trenton to the New Jersey Steel & Iron Co. The total weight of the bridge will be 2,000 tons and it is to be completed in four months.

A STATEMENT of Alabama and Tennessee iron shipments in 1897 published at Birmingham shows 1,119,892 tons of pig iron sent from furnaces in these States in the year, Alabama furnaces shipping 749,065 tons. The exports were 218,633 tons, against 65,000 tons in 1896. From April to January stocks in furnace yards in Alabama and Tennessee decreased 100,000 tons. The last four months of the year showed a very heavy increase in business. Shipments of cast iron pipe from Alabama and Tennessee foundries in 1897 were 90,000 tons.

Review of the Technical Press.

[Translations, Condensation and Comment expressly for The Iron Trade Review by Dr. Richard Moldenke.]

Testing Metals by Impact.—[*Engineering News*, Jan. 13.]—In view of the increasing interest manifested in the testing of materials for structural purposes, a paper read before the American Society of Civil Engineers, by Mr. S. Russell, describing a new machine for testing materials by impact, is very timely. Mr. Russell first defines resilience as the work absorbed in the deformation of a metal due to external stresses applied, and gives a practical turn to the discussion by stating that resilience is really toughness reduced to measurement. Going deeper into the subject, resilience depends upon the change of stress, and hence a suddenly applied load gives results differing from those of one applied gradually. Then again the subject should be studied from four standpoints, those of stresses due to tension, compression, torsion, and bending. Experiment alone can determine the relative resilience existing in a material tested in these four ways. A knowledge of the resilience of a material enables us to judge it so far as its fitness for the work in hand is concerned. Mistakes are often made by not giving heed to the properties of materials, as shown by the various tests they can be subjected to. The difficulties met with in studying certain types of structural material are sometimes very great, as so many factors enter into the calculation. Impact tests are therefore usually made on the finished shapes, and under standard codes, such as the specifications for axles, car wheels, draw bars, and steel rails. There is a practical necessity for a definite physical test for the ultimate resilience of materials subjected to impact, and the problems of steel inspection would be greatly simplified, according to the author, by specifying a definite resilience under impact, instead of limiting the percentage of phosphorus, etc. Mr. Russell describes a new impact machine devised by him in which the energy actually absorbed in breaking the test bar can be measured. This is accomplished by using a hammer in the shape of a pendulum so arranged that it strikes a horizontal blow, breaking clear through the bar, and swinging freely up to the height due to the velocity after the impact. The test piece resting against the two verticle knife edges is struck in the middle by the falling pendulum, and thus gives the ultimate resilience of the bar under transverse stress. A full description of the machine then follows, illustrations of which are printed in the text, and then a discussion of the various errors to be allowed for in the results, due to the friction of the machine, the inertia of the test bar itself, etc. Formulas and tables come next, and the following conclusions are reached: 1st—Definite values for the resilience of brittle materials may be reached; 2nd, for tough materials, such as wrought iron, definite relative values for the resilience of metals of the same class may be obtained. Finally the paper calls attention to the value of a thorough knowledge of the resilience of materials used in structures, in designing work exposed to live load and shock. Iron and stone can replace wood with a greater assurance of safety than is now the case, and thus keep out useless material which is generally a positive detriment to a structure.

Sulphur in Coke.—[*Stahl und Eisen*, Jan. 1.]—Mr. O. Simmersbach discusses the question of sulphur in coke, a subject of the utmost importance to the iron trade. The amount of sulphur depends upon the constitution of the coal chemically considered, and on the method of finally quenching the incandescent coke. The sulphur of a coal is present in the form of iron pyrites; then again as an organic compound combined with carbon; less frequently the sulphur exists as a sulphate. The sulphides are decomposed, about one-fourth of the sulphur escapes, the amount really depending upon the yield of coke; the higher this is, the more sulphur is eliminated. The sulphates in the coal, such as gypsum, are reduced to sulphides. The sulphur, however, thus set free is taken up by the iron reduced out of the ash and again forms a sulphide of iron. Thus a coal rich in iron oxide holds a lot of sulphur which otherwise would have escaped. As a consequence, we have the somewhat anamolous condition of a coke richer in sulphur than the coal it was made from. This statement is amply borne out by an elaborate table of coke analyses. We know very little as yet of the action of coal ash in absorbing the sulphur, but there seems to be a definite relation between the composition of the ash and the sulphur contents of the coke. Studies made by C. Von John show that free sulphur cannot be traced in coal, that the carboniferous formations yield a coal which loses much less sulphur in coking than the more recent coals in which the sulphur is mostly in an organic combination. The trouble with sulphur in the coke for blast furnace purposes is that it arrives at the tuyeres unchanged, and burning there unites with the melted iron, while the sulphur in the ore is acted upon chemically further up and does not come in contact with the melted iron to any great extent. The sulphur oxidized to sulphurous acid is decomposed by the combined action of carbon and silica acid at the high temperature prevailing, one portion of it goes to the manganese. Again sulphide of calcium is made from gypsum. All the sulphides except iron sulphide go into the slag, the latter being soluble in the iron goes into it. Owing to the peculiar hindering action of metallic sulphides, in the processes of assimilation, slags containing them have a slower action than would otherwise be the case. The best protection from sulphur in making pig iron is to add a sufficient quantity of limestone; magnesia is not so efficient, except when the ore is poor in alumina. The presence of manganese also promotes the removal of sulphur, but it must not be forgotten that once the sulphide is in the iron, an excess of lime or manganese will be of no avail. In the cupola we have nearly the same reactions. With a sufficiently high temperature the addition of limestone will remove all the sulphur, a condition which may be possible but unfortunately is never realized in American foundry practice. A basic lining in the cupola also helps this desulphurization. Sulphur lowers the total carbon of an iron and hinders the formation of graphite; this is especially the case in making foundry pig iron. Furthermore, sulphur hardens and renders iron less fusible but does not affect the strength to any extent, a statement which is open to considerable discussion. In the cupola, iron rich in sulphur, while melting easily, does not remain fluid long and will not fill the molds properly. The castings also have blow-holes. High sulphur in the coke, moreover, has a further pecuniary disadvantge. It requires more limestone, which in turn increases the cost of the furnace burden correspondingly. Nearly all coke has an average of 1 per cent of sulphur. Our present methods cannot reduce this. Possibly in the future some process which compacts the coal, thus reducing the loss of carbon in coking, will bring about a corresponding reduction in the fluid sulphur contents of the coke.

RECEIVED FROM THE TRADE.

The Inland Iron & Forge Co., 1227-1229 Marquette Bldg., Chicago, operating the plant at East Chicago, Ind., formerly owned by the East Chicago Iron & Steel Co., has just issued in pamphlet form a list of its manufactures. These comprise bar iron and steel, band iron and steel, angles, channels, special shapes for car, agricultural implement and carriage work, and iron and steel car axles and forgings.

Chas. E. Billin & Co., engineers and purchasing agents, 1533 Marquette Bldg., Chicago, have issued the first number of a "Catalogue of Machinery Supplies for Mines and Mills." It contains 64 pages of descriptive matter, illustrating various tools and supplies, and is very nicely gotten up in standard size, 6 by 9 inches. It is proposed to issue the catalogue periodically, to make it always up to date and continuously valuable to the mine buyers.

The excellent article contributed by Spencer Miller to *Cassier's Magazine* on "American Cableways in Open-Pit Mining" has been published in pamphlet form by the Lidgerwood Mfg. Co., 96 Liberty st., New York. The paper is plentifully illustrated and gives a good idea of the flexibility of the system of conveyance, and of the problems solved by its employment. It is stated on the fly-leaf of the pamphlet, though this did not appear in the original, that all cableways referred to in the paper as installed for open-pit mining in the United States were furnished by the Lidgerwood Mfg. Co. A special sketch-book illustrating cableways will be sent by the company on application.

EFFECTS OF PHOSPHORUS ON THE STRENGTH AND FUSIBILITY OF IRON.*

BY THOS. D. WEST.

Since writing my second paper on the comparative fusibility of foundry metals, I have been experimenting on the effects of adding phosphorus to iron, to learn what changes were thus caused in the strength and fusibility of iron. Some important discoveries have resulted, which briefly stated are that adding phosphorus to Bessemer iron by my plan increased its strength from 25 to 75 per cent, as can be seen by tests Nos. 1, 5, 13, 21, 23 and 27, Tables Nos. 1 and 2. I have also found that the addition of phosphorus greatly increases the fusibility of solid iron, as is to be seen by Table 4. What will be the effect of adding phosphorus to iron having that element higher than .10, the limit of standard Bessemer, I have yet to determine.

In making these phosphorus experiments I used two ladles, one holding about 200 pounds of iron and the other 35 pounds. The metal was caught in the large ladle at the cupola and when carried to the molds about 30 pounds was poured out of it into the small ladle, in which sticks of phosphorus had been placed before pouring in the metal. The mixture was then stirred with a small rod as long as the fluidity would permit, it being not too dull to pour the test bars properly. Phosphorus is conceded to add fluidity to

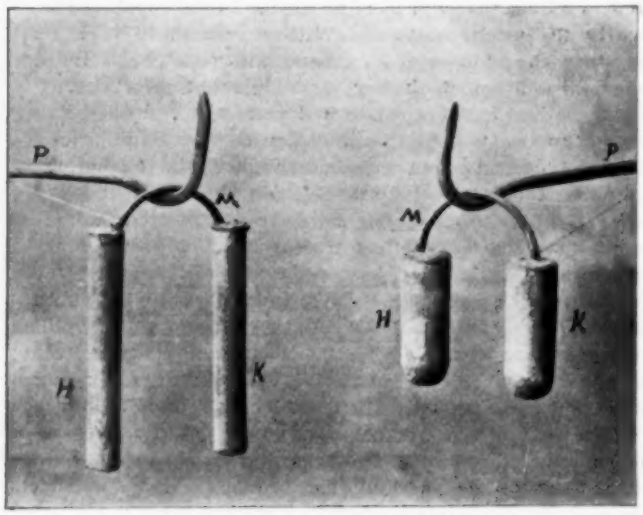


FIG. 3. FIG. 4.

metal, but this method of adding it to iron causes the latter to solidify rapidly—an opposite effect to that found in using pig irons in which the phosphorus runs well up.

After the test bars had all been cast, I forwarded them to Dr. R. Moldenke, the well-known metallurgist of the Mc-Conway & Torley Co., Pittsburg, who kindly tested them for their tensile and transverse strengths as given in Tables Nos. 1 and 2. He also furnished the analyses of their casts as seen in Table 3. For the first cast, Tables 1 and 2, I made two bars about 1½ inch diameter, cast on end, one of which was poured from the regular cupola metal and one after the phosphorus was added. For the next two casts, I used 1¼ inch round bars so as to obtain a greater number, which, as will be seen, had four bars for each cast, two being of the regular metal, and two having the phosphorus added to them. All of the bars were cast on end, so as to aid in securing solidity and uniformity in texture.

A remarkable feature of these tests is the phenomenal increase in strength that a slight addition of phosphorus makes. I know of none having demonstrated heretofore the effects of phosphorus in so greatly increasing the strength of iron as shown by the tests herein exhibited. I feel all will be interested in this line of research, which I shall follow up in other ways and report my findings from time to time as the work progresses.

TABLE 1.—COMPARATIVE TENSILE TESTS WITH PHOSPHORUS ADDITIONS.

TESTED BY DR. R. MOLDENKE.

	Analysis Letter.	No. Test.	Area.	Ultimate strength.	Ultimate strength per sq. in.	Average.
1st Cast Phosphorus addition.	A	1	1.94	53620	27640	27640
	A	2	This	bar broke	with a flaw	
1st Cast Regular Iron.	B	3	1.77	27010	15260	15130
	B	4	1.77	26530	15000	
2nd Cast Phosphorus addition.	C	5	1.09	27400	25140	23790
	C	6	1.09	26090	23840	
	C	7	This	bar broke	with a flaw	
	C	8	1.06	24260	22390	
2nd Cast Regular Iron.	D	9	1.07	18730	17500	17617
	D	10	1.07	19430	18160	
	D	11	1.09	18550	17330	
	D	12	1.09	18700	17480	
3rd Cast Phosphorus addition.	E	13	1.09	29810	27350	26070
	E	14	1.09	27450	25190	
	E	15	1.09	29600	27160	
	E	16	1.09	26300	24600	
3rd Cast Regular Iron.	F	17	1.09	19580	17970	16890
	F	18	1.09	18100	16610	
	F	19	1.11	18720	16870	
	F	20	1.11	17890	16120	

TABLE 2.—COMPARATIVE TRANSVERSE TEST WITH PHOSPHORUS ADDITIONS.

	Analyses Letter.	No. Test.	Dia.	Deflection.	Load.
1st Cast, Phosphorus addition.	A	21	1.57	.125	8220
1st Cast, Regular Iron	B	22	1.50	.08	4180
2nd Cast, Phosphorus addition.	C	23	1.16	.155	3632
	C	24	1.16	.145	3400
2nd Cast, Regular Iron	D	25	1.18	.12	2430
	D	26	1.18	.12	2080
3rd Cast, Phosphorus Iron	E	27	1.18	.115	3430
	E	28	1.18	.17	3318
3rd Cast, Regular Iron	F	29	1.19	.09	2630
	F	30	1.19	.122	2188

TABLE 3.—CHEMICAL ANALYSES OF TEST BARS IN TABLES 1 AND 2.

Letter.	1st Cast.		2nd Cast.		3rd Cast.	
	A	B	C	D	E	F
Phosphorus	.161	.088	.136	.095	.173	.093
Silicon	1.48	1.53	1.46	1.48	1.32	1.37
Manganese	.65	.68	.58	.60	.63	.65
Sulphur	.03	.03	.03	.03	.03	.03
Graphitic Carbon	2.10	2.90	1.80	2.48	1.84	2.66
Combined Carbon	1.85	1.20	2.44	1.84	2.19	1.50
Total Carbon	3.95	4.10	4.24	4.32	4.03	4.16

As founders, we have very vague knowledge up to the present time of what combinations of the metalloids are the best in cast iron to protect it against the action of heat or fire. As an example, we often find inquiries being made as to what kind of iron is best for the manufacture of such castings as annealing boxes, pots, grate bars and the like. I have started investigation in this line and present Table 4 to show the effects of phosphorus on fusibility, when immersed in liquid iron. By a study of this table, it will be seen that the high phosphorus irons melted away first. The plan I originated to make the test shown in Table 4 is exhibited by Figs. 3 and 4, which display two sizes of fusing test specimens. At H and K, Fig. 3, are bars 1½ inch diameter by 12 inches long, connected by a rod M. H and K, Fig. 4, are test specimens 2⅜ inches diameter by 6 inches long. In casting these test

TABLE 4.—COMPARATIVE FUSION TEST BY IMMERSION OF BARS NOTED IN TABLES 1 AND 2

Diameter of Rolls.	1st Cast.		2nd Cast.		3rd Cast.	
	1⅜ ins.	2⅜ ins.	1⅜ ins.	2⅜ ins.	1⅜ ins.	2⅜ ins.
Time of Dipping	2:00	3:00	2.00	3:00	2:00	3:00
Time of total fusion lower phosphorus bars	2:03½	3:04¾	2:03	3:04¾	2:03¾	3:05
Time of total fusion higher phosphorus bars	2:02½	3:03½	2:02¾	3:03¾	2:02	3:03½
Difference in time of melting	1 min.	1¼ min	¾ min.	1¼ min	1 min.	1½ min

* Read at the meeting of Pittsburg Foundrymen's Association, Jan. 31, 1898.

specimens, one was poured with the regular cupola metal, and the other with the metal after the phosphorus had been added in the manner described. By using a hook as at P, Figs. 3 and 4, to let these test specimens sink into a ladle of molten metal, it will be readily seen that both bodies H and K must be subjected to exactly the same conditions of heat, etc., in testing their fusibility. By such a plan, if H melts down before K, we have positive proof that H possesses a lower fusing point than K. I find this the simplest and most inexpensive plan to test the fusion of mixtures, or the effect of any one of the metalloids on the fusibility of iron.

THE FOUNDRYMEN'S ASSOCIATION.

There was only a small attendance of members at the regular monthly meeting of the Foundrymen's Association, held at the Manufacturers' Club, Philadelphia, on Wednesday evening, Feb. 2, the inclemency of the weather being apparently responsible for the falling off.

Secretary Evans announced that the executive committee had no report to make, but speaking for the treasurer, reported a balance of $1,601.69 to the association's credit.

"At the request of the Manufacturers' Club," said Mr. Evans, "I submit the following:

Resolved, That the Foundrymen's Association of Philadelphia declares itself in favor of maintaining the gold standard and respectfully urges the enactment by the Senate and House of Representatives of the United States, of necessary loans to strengthen the public credit on the lines laid out and recommended in the report of the Monetary Commission of the Indianapolis convention.

Resolved, That the Foundrymen's Association of Philadelphia, heartily concurs in the sentiments expressed by the President of the United States in his speech before the meeting of the National Association of American Manufacturers' in New York City, and pledges to him the support of the Foundrymen's Association of Philadelphia in his efforts to maintain the credit of the United States Government.

After a few remarks by President Wanner, Francis Schumann and Secretary Evans in favor of the resolution, it was unanimously adopted.

Mr. Evans then referred to the National Founders' Association whose meeting for organization was recently held in New York City, and called upon Mr. Schumann to tell briefly the objects of the Association. This Mr. Schumann did, and further suggested that a discussion of the new organization, which, as has been explained in these columns, is designed to harmonize the relations of employers and employes, be made a special order of business at the March meeting. This was agreed to.

Linson H. DeVoe, of the Staten Island Clay Co., Woodbridge, N. J., was then introduced and read the following paper upon

Cupola Linings.

Telling a foundryman how to line a cupola is not unlike carrying coal to New Castle; unless we assume that a day is poorly spent when nothing is gained. During the first years of my connection with the fire brick industry, that which attracted my particular notice was the cupola. Between the foundryman and the fire brick maker, disputes, at times, arise. Is the fire brick manufacturer always in the wrong. If the bricks are first quality, should not as much care be used in laying up the bricks as in the manufacturing? This evening, I propose to explain how the cupola should be lined to give best results. Many cupolas have been and are lined as I will explain, and good results always follow.

To line a cupola the first step is to procure fire bricks. What quality of fire bricks? The best for that class of work. Then comes the question of cost. How do you intend to line—single or double lining, blocks or 9-inch bricks? Decide as you will, the order usually goes to the lowest bidder. But is it always best policy to do so? Are you practicing real economy? Is the cost of the lining of such magnitude that it requires much study? Later on, I propose to show to you that the cupola lining is one of the smallest items of expense in the foundry, if not the smallest.

There are several good methods of lining a cupola, any of which are satisfactory and economical if the bricks are laid skilfully. We will treat of them separately.

Single lining, using blocks: The term "block," as here applied, refers to a fire brick of twice or more times the bulk of a standard 9-inch brick. There is no good reason why blocks should not outlast 9-inch bricks, unless improperly laid. You are well aware that the shell of the cupola expands when heated; but perhaps you never have noticed that the immense pressure exerted against the lining while filled with molten iron causes the lining to expand against the shell. When the cupola cools, contraction of the shell occurs, but, the bricks, being coated with iron and cinder, do not respond to this fearful pressure, or squeezing; consequently they are crushed and cracked. To all outward appearances, the bricks are as good as ever, and not until the man cleans out in the morning and the bricks crumble, does any change appear. Then the bricks are condemned, but nothing is said about the laying of them. This occurs during the first two or three melts in a new lining.

Two occasions only have I known in which the foundryman realized the cause of the rapid disintegration. To avoid this, when laying the bricks, leave a space between the shell and the brick, of one-half or three-quarters of an inch and fill this space with dry, finely ground cinder and fire clay mixed. This acts as a cushion and takes up the expansion and contraction.

Single lining, using 9-inch bricks: The various 9-inch segment bricks, such as arch, bull-head, wedge and key, are made in so many sizes that almost any circle up to 8½ inches diameter may be laid with them. Naturally more care must be observed in laying these, as they present many joints for the molten metal to attack. Frequently, two or more sizes are combined to turn the circle perfectly. The melter and his helper are the best hands to employ to do the work, as masons usually make the bonds between the bricks too large, where only the very thinnest mortar should be rubbed on for bonding. In fact, some foundries simply dip the bricks into mortar made almost as fluid as water; and that is the best method, but more time is required drying before running off a melt. Whether the bricks are laid to make a 4½-inch or 9-inch wall, the same rule will apply as regards spacing between wall and shell. When the bricks are laid against the shell, with the 4½-inch wall, the crushing and disintegration is not noticed to any extent, but the wall soon loses its regularity and becomes prey to the cinder and slag. In the 9-inch wall, the crushing and disintegration are more noticeable than in the block lining. The spacing is an essential, regardless of the size of the bricks.

Double lining—9-inch bricks and blocks: This method is in general use and should be the most economical of all linings, unless too much economy is observed at the outset. Many foundrymen, to save a few dollars, have the outer lining, the one against the shell, a 2½-inch wall. As there are no 9-inch segment bricks for laying in that manner, the "square" brick is used; but you very readily see that the space formed by the angles at the back of the brick as well as between the shell and the long-side brick—the length of the latter being the chord of the arc formed by the shell—must be filled in, so that some sort of bond is effected. The fire clay mortar soon dries and crumbles and this wall loses its stability. To avoid that trouble and annoyance, lay a 4½-inch wall of 9-inch arch bricks; see that the job is well done and every joint tight, and you have a protecting wall which will last many years. It is advisable to lay the inner lining of blocks close to the outer, without any space between. Iron sometimes works through, and should there be any space for the iron to run down, the two walls become cemented, necessitating breaking and repairing what would otherwise have been a permanent lining.

The economy in double lining consists of the amount of work which the inner wall will perform. As there is no danger of the shell being burnt, it being protected by the permanent lining, the blocks may be used until nothing remains but a mere skin. In fact, the cupola always has a lining, and the annoyance of having the foreman advise you that "the lining has worn through to the shell and we can't run off another heat till the cupola is relined," is avoided.

Double lining—two 4½-inch walls, 9-inch bricks: There are many objections to this method, the principal one being lack of stability. Having but 4½ inches bearing surface, and being nine inches high each row, the inclination is to top-heaviness, which soon becomes apparent by the wall bulging, requiring frequent repair. Naturally the cupola expense

account is rather heavy, and the foundryman goes from one manufacturer to another, in his endeavors to obtain "good" bricks. In the majority of instances, the fire bricks are first class; the actual trouble being in the foundry. Intelligent discrimination in the selection of the proper lining for the work required, as well as quality, would save money for the foundryman; and the fire brick maker would not receive so many complaints.

Keep on hand an extra lining; it is good assurance. Accidents occur when least expected. No one expects the blower or wind-pipe to break down; but if either should occur, the lining would be a dead loss when the iron was broken out of the cupola.

When laying bricks during cold weather, see to it that they are absolutely dry. The moisture they absorb from the fire clay is sufficient to make them "set" after laying. A good way to drive frost or moisture out of bricks is to set them around the boilers or over the core ovens.

Dip the bricks into very thin mortar and rub them down to as tight a joint as possible. Do not lay in mortar as though they were red bricks. Every man who lays bricks in a cupola will say that he does not use thick mortar; but there are many opinions as to just what defines thick and thin. Never use a metal hammer to hit a brick; a mallet will give all the force needed without injury to the brick; but a hammer will crush or crack fire bricks at every blow. The fire mortar, or fire clay, must be of excellent quality, or the molten iron may flux it. Select, when possible, enough hard-burned bricks to lay up for two or three feet opposite and below the charging door. Some melters are careless and throw pig and scrap with such violence that the lining opposite the door is destroyed more rapidly than that above the tuyeres. Many fire bricks are condemned through the recklessness of the man who "chips-out" in the morning. He endeavors to rush matters which should be done carefully.

In many instances the man is not to be blamed; the heap of cinders below the bed plate has not cooled to any extent and has been adding its heat to that of the cupola's interior. Consequently the job is too warm to linger over. But that excuse will not apply to all cases, and great care should be exercised to the end that the bricks are not broken or chipped unnecessarily. I find that very little supervision is given to that part of the work, and many times good bricks have been condemned owing to the helper's indifference. If the wind is shut off two or three minutes before dropping the bottom, and some iron left to run out with the cinder, the tendency of the iron is to drag out a goodly portion of the cinder which would otherwise adhere to the bricks.

Running out the last pound of iron and then shutting off the wind is a detriment to the bricks.

As to the qualities necessary to make good bricks: The clays must be highly refractory, blended in such manner that the finished article for the work intended (in this case cupola linings) shall be fairly close, hard enough to stand erosion and jarring, yet porous enough to expel quickly the heat absorbed during the melt.

To buy cupola bricks on the strength of chemical analysis is an unwise proceeding. Analysis of fire bricks for some work is like statistics. When trustworthy, they sometimes make one feel very uncomfortable.

In conclusion, I beg to submit estimate of cost of cupola lining, for one year, per pound of iron melted. This estimate is not a theory, but taken from figures furnished by foundrymen to me at various times.

I find that there are more cupolas 60 inches diameter lined down to 48 inches than any other size, and have adopted that size for my illustration. Usually, that size is lined for 15 feet with cupola blocks, which brings it to the top of the charging door. Above that height, the lining will last many years. The prices given are based on small quantities, less than carloads, and are purposely quoted at an advance over the actual selling price. Labor, however, is the average wages paid in 20 shops:

60-inch shell, lined to 48-inches—17 blocks to a course of 4 feet high.

Cupola lining, 15 feet (cost put in foundry)	$100.00
Fire mortar, to lay above	4.50
Labor, 2 men, 1 day, @ $2. per day each	4.00
Relining at melting zone at end of 6 months, say 4 feet	26.80
Labor, 2 men, ½ day each	2.00
Labor, "picking" and cleaning interior of cupola daily for 280 working days*—1 man, 2 hours daily, @ 18c. per hour	100.80
Clay required for making "daub," about 5c. daily	14.00
Total cost lining and repairs end of year	$252.10
9 feet of this lining is still good for at least another year, hence is worth 50% of original cost	32.85
Net cost lining	$219.25

*Note—This allows for 61 holidays and Sundays and two weeks for stock taking.

The product of a cupola this size is about 10 tons daily average, or 2,800 tons annually=5,600,000 lbs., making the cost .0039 of 1 cent per pound of iron melted.

After the reading of the paper, Mr. Evans asked: "You use single lining in a 60-inch shell?"

"Yes, in such a case double lining is seldom used. The single is better."

Mr. Schumann: "Then you would recommend instead of two thicknesses, one thickness equal to two?"

Mr. DeVoe: "We like to make them that way, but I should not recommend that. A great many foundries are using No. 2 brick for outside lining instead of No. 1; but No. 1 is better."

Mr. Glover: "I used a salmon brick for six years once."

Mr. DeVoe: "That may be. It sometimes happens, but you must have a careful melter or there will be trouble."

Mr. Evans: "What is the best for fluxing, oyster-shell or lime stone?"

Mr. DeVoe: "I must decline to answer that."

In reply to another question, Mr. DeVoe said a hard brick was better than a soft burned brick or a light colored one. There was some further discussion of minor importance and Mr. DeVoe was tendered a vote of thanks. Shortly afterwards the meeting adjourned.

THE TIN PLATE MARKET.

The month of January will long be conspicuous as one of the dullest Januarys in the history of the business. The demand through the East has been very much less than ordinarily comes early in the year and comparatively little interest has been shown by buyers through the West. What little business has been closed has been sought after eagerly, and notwithstanding the fact that all of the mills claim to be well filled with orders there still is active competition when an order is to be closed. There is no quotable change in the market, which stands to-day f. o. b. Pittsburg and Indiana district, as follows:

CHARCOAL TINS.

	IC	IX
Lisvane Grade,	$3.45	$4.20
Calland Grade,	3.65	4.35

COKE TINS.

IC, 108 lb. Basis weight,	$2.95
100 lb. " "	2.80
95 lb. " "	2.70
90 lb. " "	2.75
85 lb. " "	2.60
80 lb. " "	2.60

TERNE PLATES.

IC, 216 lb., 20 x 29	$5.85
200 lb. "	5.55

The committee of four which was appointed at the January meeting of tin plate makers in Pittsburg was in session in Chicago recently. The meeting had under consideration various forms of agreements and combinations, and, as previously mentioned, the plan of combination most favorably considered for the tin plate industry is that of the proposed American Steel & Wire Co. It is reported that the committee went to New York last week and was in conference with the large jobbing interests in the hope that they will come into the combination as stockholders and sales agents of the output.

The trade as yet takes little interest in these negotiations, and no buying has developed in anticipation of the higher prices that would prevail should the present negotiations result in a combination.

THE Greenville, Pa., rolling mill will resume operations Feb. 14.

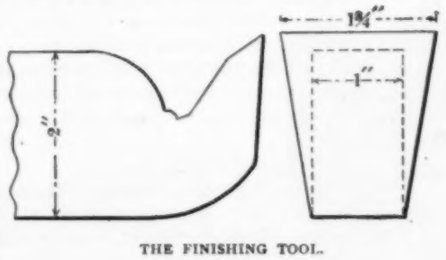
CAST IRON THAT GAVE A LARGE CHIP.

A chip turned from a 24 inch chain drum in the shop of the Shaw Electric Crane Co., Muskegon, is shown in the illustration below, which is reproduced from the *American Machinist*. The chip was made in taking a finishing cut with the tool illustrated in the same connection. Castings are furnished to the Shaw Electric Crane Co. by E. J. Sherwin whose mixture for chain drums is as follows: Hinkle charcoal iron, 30 per cent; Cherry Valley No. 2 foundry, 50 per cent; machinery scrap, 20 per cent.

"The drums are cast in dry sand and remain in the mold all night, and sometimes part of the next day, before any attempt is made to move them. They are cast on end. The

A CAST IRON CHIP.

drums are from 18 inches to 33 inches diameter, and are cored out so that the walls are from 1¾ inches to 2¼ inches in thickness, which of course varies with the load they are to have, and they are ribbed around the inside. The cutting speed used on both roughing, finishing and grooving is about 14 to 18 feet per minute without crowding the machine. The



THE FINISHING TOOL.

chip was from the finishing or smoothing cut. Sometimes these chips roll up even larger than that shown, which is a good average specimen."

In writing to the same journal, Mr. F. F. Hemenway thus comments on the occurrence of long chips of metal in lathe work:

"The chip illustrated is evidence of good material and good workmanship in the turning. In 1860 or 1861, the Putnam Machine Co. were making some steel guns for the State of Massachusetts. The trunnion pieces were of cast iron, weighing about seven tons each. From the faces of these pieces remarkably long chips were cut, not coiled so much or so closely as the one you show. The old tool dresser, who was an expert steel worker, would readily weld two of the pieces of a chip together, heating in his ordinary fire. This was the only instance in which I ever saw cast iron welded, although it may be common enough to others.

"It may be of some interest to know that this casting was imported from England, and that after it had been secured to the face-plate of the lathe we found that no tool we could make, whether made of the best American steel or the best English steel we could buy, would cut it at all. The casting, therefore, hung upon the face-plate (the lathe was a special one built for the job) until steel could be imported from England to do the work. American steel makers have made great progress since that time, and I have no doubt could now easily supply a steel as good as that we waited so long for in the early '60's."

At a meeting of the stockholders of the Laughlin Nail Co., of Wheeling, W. Va., to be held Feb. 23, a resolution will be offered to extend the life of that corporation 50 years, or to March 11, 1948.

EDISON'S "NEW METAL."

The report concerning the discovery of a "new and mysterious metal" in connection with the use of iron ore concentrates from Thos. A. Edison's plant at Edison, N. J., has been widely commented on. As noted in these columns a few weeks ago, the "revolutions" in iron and steel processes are so common on paper that this last discovery of the newspapers deserves to be taken with some allowance pending investigation. The *Engineering and Mining Journal* has been following up the matter, and gives the following:

"A great deal has been current in the press lately about Mr. Thomas A. Edison's concentrating plant for iron ores at Edison, N. J., and the latest paragraph which we find asserts that in working in the furnace iron ores from this plant a new and mysterious metal was found, the nature of which could only be determined by further tests and analyses. This metal, the paragraph said, could not be handled by ordinary methods. We have taken some pains to investigate this report, and we find that it has probably been concocted by some enterprising paragrapher who relied on the name of Edison to give currency to his work. The ore briquettes from Edison concentrates were worked in one of the furnaces at Catasauqua, and no trace of any rare or new metal was found in the pig iron made from these briquettes. The iron was considered unusually strong for foundry purposes, which was, no doubt, due to its rather low percentage of phosphorus and silicon. It analyzes about 1.75 per cent of silicon and 0.18 per cent of phosphorus, and has about the same strength as a special low phosphorus metal which is now being made in one of the furnaces there, and averages below 0.03 per cent in both sulphur and phosphorus. The briquettes analyze about 65 per cent in metallic iron, with .038 per cent of phosphorus, no sulphur, a trace of titanic acid, and small quantities of alumina, lime, magnesia and silica, and they worked very easily in the furnace. That the percentage of phosphorus in the iron, given above, is somewhat higher than is due to that in the briquettes, is accounted for by the fact that the furnace charge consisted of 90 per cent of the Edison ore and 10 per cent of local hematite ore, the latter supplying the additional phosphorus. It is of interest to note what Mr. Edison himself, who has courteously written us on this point, says:

"'The account in the papers was distorted. It arose from the iron produced at Crane Iron Co. from our briquettes being abnormally strong. It graded No. 1X, yet required 15 blows of a 15-lb. sledge, when supported at the ends, to break it. Analysis shows cobalt in rich streaks in the deposit, but as nobody seems to know what cobalt does, the toughness may be due to something else.'

"The steel and iron experts give, as this letter says, nothing definite on the subject of cobalt in iron; but it seems not improbable that its effect in such an alloy would be similar to that of nickel. The mysterious new metal thus disappears entirely on investigation, and we find nothing that cannot be fully accounted for without introducing any new or unexpected cause.

"The Edison plant, it may be added, is not yet commercially in the field. The output to date has been limited to about 1,200 tons of ore-briquettes which were smelted at Catasauqua."

American Bids on British Rail Contracts.

An English exchange in referring to the acceptance of an American bid for steel rails by the Liverpool city council and of the award to an American firm of the contract for equipping Plymouth electric tramways, gives the following bids on a contract for street rails (joints included) at Hull, the business going to one of the Continental bidders: Societe Anonyme des Acieries d'Angleur, £6 7s per ton; the Johnson Co., Lorain, U. S. A., £6 13s per ton; Pennsylvania Steel Co., £6 14s 9d per ton; A. & F. Manuelle, German (exclusive of joints), £6 11s 6d per ton; A. Penny & Co. (Continental) £6 14s 10d per ton; Leeds Steel Works, £7 9s per ton; Dick, Kerr & Co., £7 10s per ton; Barrow Hematite Co., £8 10s per ton.

The remodeling of Edith Furnace of the Oliver & Snyder Iron & Steel Co., referred to in a recent issue, may not be undertaken for several months.

ARMOR PLATE QUESTIONS.

Secretary Long, Chief Constructor Hichborn and Chief O'Neil, of the Bureau of Ordnance, appeared before the Senate Committee on Naval Affairs, recently. The Secretary said, in response to questions, that the Navy Department had prepared full plans and specifications calling for an armor plant under the last naval appropriation bill, and that estimates on the cost of land, tools and machinery necessary to equip the plant had been made. The bids were to be opened on the 29th inst., and the thought several bidswould be made. Secretary Long said also that in view of the report of the committee which he had appointed to consider the question of a Government armor plant, and their report on the great cost and delay it would involve, he had enteredinto further negotiations with private armor plants now furnishing armor for other shps, and he believed that he could make a contract for the supply of armor plate for the Illinois, Alabama and Wisconsin, now under course of construction, which would be ready whenever the ships were ready to receive it, at the rate of $400 a ton. The Secretary recommended, in view of the circumstances, that an arrangement to this effect should be made. From the Secretary's statement, corroborated by Commodore Hichborn and Capt. O'Neill, it appears that the cost of a Government plant properly equipped would be from $3,500,000 to $4,500,000. He said this estimate includes all machinery for making armor plate, guns and projectiles, and added that if the Government adopts the policy of providing its own plant no armor could be expected from such plant for about three years. The committee has taken no action upon the armor-plate matter, and it is considered probable that the whole question will receive attention.

In accordance with the advertisement issued recently, proposals were opened in the office of Secretary Long, Jan. 29, for the construction of a Government armor plant, for the sale to the Government of sites suitable for such a plant, and for the machinery and buildings necessary if the Government decides to make its own armor. There were 29 bids and they covered every phase of the advertisement. Many of the proposals were merely offers to give sites to the Government conditional upon the location of the plant, and a number of others were for the supply of machinery.

There were only two bids to furnish a complete plant, and only one of these named a figure. The two companies now engaged in the manufacture of armor for the navy did not submit proposals. The Huntington (W. Va.) Chamber of Commerce offered to follow the specifications of the board and build a complete plant for $3,325,905, including site, buildings and plant. Another offer to supply a complete plant came from the John P. Holland Torpedo Boat Co., of New York, but no figure was named. In connection with a bid by the Rearick Engineering Co., of Columbus, O., was an offer from the Chamber of Commerce of Columbus, to donate $500,000 in case the plant is located in that city. Offers of sites for a plant gratis, or for a nominal sum of money, came from Muskegon, Mich.; Youngstown, O.; Escanaba, Mich.; Duluth, Minn.; Ensley, Ala.; Lorain, O.; Winthrop Harbor & Dock Co., of Chicago; Sheffield, Tenn.; Waukegan, Ill.; Detroit, Mich.; Peoria, Ill.; Marquette, Mich.; and Anniston, Ala. Some of the big Western tool concerns made offers to supply machinery needed for the plant. In the list were the Morgan Engineering Co., of Alliance, O., and the Niles Tool Works, Hamilton, O.; Bement, Miles & Co., of Philadelphia, and Deitrich & Hervey, of Baltimore. It will take sometime to schedule all these bids, but as soon as all can be arranged they will be sent to Congress.

The Carnegie Steel Co. repudiates the story published in the New York *Herald* to the effect that $300 armor plate is a probability because of the use of a new process. The story, as originally told at the war department, was that the Carnegie Steel Co. has been making some tests for the Government with the Chase-Ghantt process, but no price was mentioned. The correspondent of the *Herald* filled in the figures. The plates being made for the Government by the new process have not been tested and it is not known what they will stand. The Carnegie Steel Co. was not asked to put a price on the process.

CLAIRE Furnace, at Sharpsville, Pa., made 279 tons of iron on a recent day, the largest output in its history.

ELECTRIC WELDING.

While the Thomson system of electric welding has given remarkable results, there are, of course, many cases in which it cannot very conveniently be employed, and where the use of the arc presents certain advantages. On the other hand, the latter, as generally used, is liable to render the iron treated brittle, owing to the carbon of the arc combining with the metal. This difficulty the Electric Metal Working Syndicate, Ltd., of 61 and 62 Gracechurch st., E. C., claims to have overcome by the use of specially prepared carbons, and the samples of their work exhibited appear to confirm this claim very thoroughly. In the apparatus for welding adopted by them the carbons are set at an angle of about 90 degrees with each other, the consequence of which is that the arc shoots out in the form of a long flame, which bisects the angle between the two carbons. This flame can then be used precisely as that of a gas blowpipe, but has an advantage over the latter in that its temperature is very much higher. In the immediate vicinity of the carbons the temperature is that of the volatilization of carbon, which is the highest attainable by artificial means, whilst at more distant points the temperature is proportionately decreased. Owing to the great length of the arc the operator is able to exercise considerable control over the temperature with which he works, by simply bringing the carbons nearer to or taking them further away from the work. The apparatus has also been very successfully used in cycle brazing. As now done with a gas blowpipe, the borax used as a flux forms an extremely hard glass-like scale, which flows over the metal in the neighborhood of the joint, and has to be removed by filing. Ordinarily, this frame filing takes between four and five hours to complete. The temperature of the electric arc, however, is so great that this scale is volatilized, leaving the frame extremely clean, so that comparatively little cleaning off is required. The system described has also been used succesfully for filling castings, it being nearly impossible to discover afterwards the repair. In one case the broken body of a Worthington pump was mended in this way in about five minutes, the fracture being such as to otherwise necessitate a completely new body.—[Engineering, London.

JOS. T. RYERSON & SON, Chicago, Western sales agents of the Ridgeley & Johnson Tool Co., of Springfield, Ill., have sent out a handsome catalogue of the valveless pneumatic tools made by the tool company. The book describes in detail, with illustrations, the Johnson-Parfitt single hammer, the Johnson counterbalanced hammer, duplex riveter, yoke and riveter and other tools for use in boiler shops, ship yards and on other tank and plate work. It is one of the handsomest of recent trade publications.

THE annual meeting of the stockholders of the National Elastic Nut Co., of Milwaukee, was held on Jan. 27, and the following were elected directors for the ensuring year: C. F. Ilsley, E. M. Spalding, Joshua Stark, T. L. Paine, John Campbell. The board of directors elected C. F. Ilsley, president; T. L. Paine, vice-president and general manager; John Campbell, secretary and treasurer.

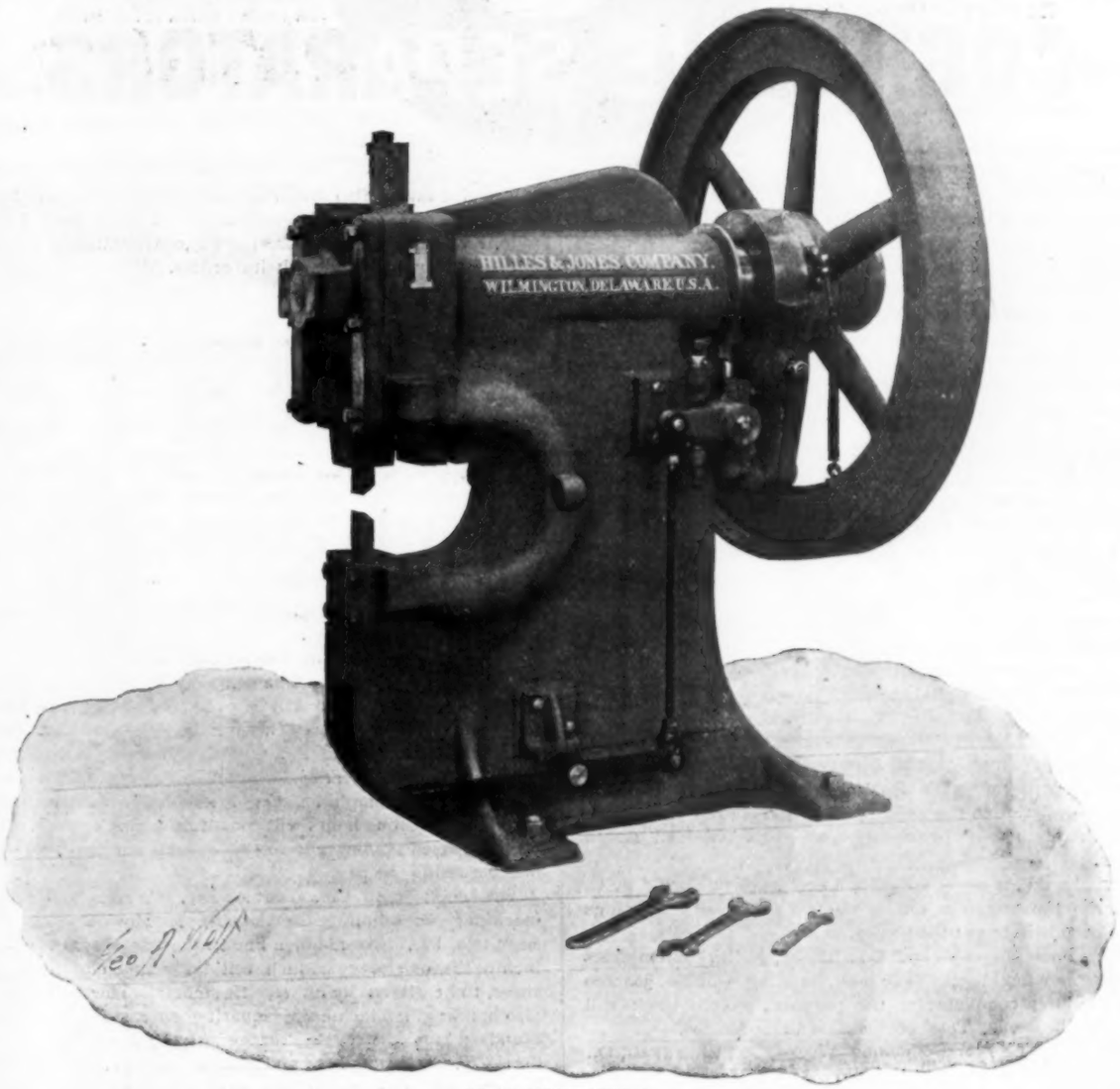
THE report of the acquisition of the Duluth Furnace by the Johnson Co., printed and reprinted in various quarters recently, is without foundation. There are no negotiations to that end.

THE West Superior (Wis.) Iron & Steel Co.'s plant, built in 1891 and long in the hands of a receiver, was sold Feb. 7 to Geo. Welwood Murray of New York, who bid in the property for the reorganization company, at $60,000. The bonds, held by the Central Trust Co., amount to $1,630,000. The Wisconsin Steel Co., the new corporation, may operate the plant after it is released from all legal entanglements. The original cost was nearly $2,000,000. The plant was operated only a few months.

GRAFTON Furnace at Leetonia, O., which has been idle about a year, was blown in Feb. 7. Extensive improvements have been made by the reorganized company and the furnace is now capable of a large output.

QUICK-ACTING SPRUE CUTTER.

The No. 1 sprue cutter of the Hilles & Jones Co., Wilmington, Del., is show in the illustration. It is designed especially for cutting off sprues or gates from brass or composition castings. The sliding head has a speed of about 75 strokes per minute, making it a very quick machine for this work. The movement of the sliding head is controlled by an automatic clutching arrangement which brings the sliding head to rest at the top of the stroke. The knives are conveniently arranged on the front of the tool, and in all points speedy performance of work and convenience of operation have been studied. The depth of throat can be varied to suit special requirements and give room to work all around the knives. Various sizes, lighter and heavier, are furnished.



NO. 1 SPRUE CUTTER.

THE New York *Tribune Almanac* for 1898 is the largest ever issued, containing 340 pages and having a variety of new features of some interest. For one who has occasion to refer in the course of a year, to some book of reference for public statistics, the platforms of parties, the names and salaries of government and state officials and the returns of recent elections, there is no more valuable source of correct information. The 1898 number contains the Constitution of the United States and the Constitution of the State of New York (the latter providing for non-partisan municipal elections). The war in Cuba and the Græco-Turkish war are reviewed, the Dingley tariff bill is given in extenso, and in addition there are the usual variety of statistics on finance, trade, agriculture, coinage, banking, production of the precious metals, population, education, public debt and expenditures, recent laws by Congress, etc.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants :—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

R. C. Iverson, Senoia, Ga., will purchase a self-feed foot-power rivet machine.

F. H. Davis & Co., 53 State st., Boston, Mass., are in the market for two 14-inch Corliss engines and a six-h. p. portable engine.

At the office of the Supervising Architect, at Washington, D. C., sealed proposals will be received until 2 P. M., Feb. 24, 1898, for furnishing all the labor and materials and erecting complete two hydraulic passenger elevators, one hydraulic mail lift, and one hydraulic ash lift, including pumps, tanks, piping, cars, platforms, etc., for the U. S. court house, custom house, and postoffice building at Omaha, Neb.

John Summersgill, Phoenix City, Ala., inquires for roller lathes and roller stock for roller-covering shop.

Sealed proposals will be received at the office of the Supervising Acrchitect, Washington, D. C., until 2 P. M., Feb. 19, for all the labor and materials required for the hydraulic passenger elevator at the U. S. post office, Pueblo, Col. Bids will be received up to Feb. 16 for an electric passenger elevator for the Government building at Little Rock, Ark.

New Construction:—

Davis & Farnum, of Waltham, Mass., builders of gas plants, iron foundries, etc., will rebuild their foundry, which was recently destroyed by fire; estimated cost, $18,000.

COCHRANE HEATERS
FOR HEATING FEED WATER
FOR PURIFYING FEED WATER
USED BY MANY OF THE LARGEST AND BEST PLANTS IN THE U.S.
HARRISON SAFETY BOILER WORKS PHILADA. PA.
MANUFACTURERS.
FOR PURIFYING EXHAUST STEAM
FOR TAKING WATER OUT OF STEAM.
COCHRANE SEPARATORS

The Griffin Wheel Co., of Chicago, Ill., will erect a new foundry building 50x300 feet at West Lake st. and Sacramento ave., to cost $14,000.

The Parlin & Orendorff Co., Canton, Ill., manufacturers of agricultural implements, propose to erect a gray iron and malleable foundry 100x330 feet, with an L 80x145 feet, in which the company will make all its own gray iron and malleable castings.

The Troy Steel Co., Troy, N. Y., has had under consideration the building of a pipe mill, its steel having given good satisfaction when used for pipe. A rod mill is also talked of. The blast furnaces of the company are now shut down waiting for a more remunerative price.

The Charles Hillman Ship & Engine Building Co., of Philadelphia, is erecting a large boiler shop 100x40 feet.

The new building of the Youngstown Bridge Co., to take the place of the burned plant, is going up rapidly. The main structure, which is 80x500 feet, is almost entirely under roof. The building to be used as machine shop, blacksmith shop and boiler room, is 60x200 feet.

The Southern Co-operative Foundry Co., organized at Rome, Ga., with a capital stock of $20,000, by A. Randall, M. C. Smith, C. E. Millican, M. M. Crocker, J. W. Russell, W. H. Alexander, and others. will erect a foundry at once. John J. Seay is interested.

Some figuring with the Hartford City (Ind.) Land Co. is going on relative to the erection of a galvanized sheet iron plant there. The land company is asked to give land and a bonus.

Carlisle, Pa., is negotiating for a beet sugar factory. F. C. Bosler is the promoter, and a number of farmers' meetings have been held to put the project in shape.

The Albion Malleable Iron Co., Albion, Mich., contemplates erecting new buildings. The main building will be 300x600 feet and fitted complete for the purpose; 700,000 brick will probably be used. Total cost will be about $20,000.

The R. K. Le Blond Machine Works Co., Cincinnati, O., has been granted a permit to build a $26,000 factory building in Linwood.

The American Coffee Co., of Brooklyn, N. Y., is erecting a new power house in connection with its plant. It is about 70x120 ft. The power house and boiler house have brick side wall construction and steel supports and roofing. Adjoining the boiler house is a coal bunker, about 20 ft. wide which carries the supply of coal in a steel bin about 30 ft. above the ground. The whole plant has been designed with convenience and economy in view, and will be a complete plant which can be economically operated. The contract for furnishing and erecting the steel framework of the building has been let to the Berlin Iron Bridge Co.

Additions, Enlargements, Removals, Etc.:—

The plant of the Q. & C. Co., at Chicago Heights, Ill., is to be enlarged. The company manufactures metal sawing machinery and various railway supplies. The offices of the company are in the Western Union Bldg., Chicago.

The Inland Steel Co., Chicago, contemplates the enlargement of its plant at Chicago Heights, Ill.

The Kankakee (Ill.) Superior Horse Shoe Nail Co. in figuring on additional plant, is considering an offer from Louisville, Ky., capitalists to subscribe $25,000 additional capital. The company is behind with its orders. Wm. W. Davies, of Louisville, is making efforts to secure the erection of the plant there.

The Wayman Foundry & Machine Co., New Kensington, Pa., has just completed improvements to its works, which will double the capacity.

Fires and Accidents:—

The copper and brass finishing works of Geo. F. Ott, on Buttonwood st., Philadelphia, burned Jan. 29. Loss about $50,000.

General Industrial Notes:—

W. S. Halsey, Penn Building, Pittsburg, desires catalogue and prices on fire escapes.

At New Castle, Pa., the Neshannock Steel & Tin Plate Co. has started its new mill. The company will give employment to 300 men. The output will be 50 tons of black plates a day.

Carmi Glover and Perry Green have purchased the Glover foundry, at New Castle, Pa., and will operate it under the name of Green, Glover & Co.

Mackintosh, Hemphill & Co., Pittsburg, have notified their employes that nine hours will constitute a day's work. The firm increased the hours to 10 about eight months ago, without increasing the pay.

The Lloyd Booth Co., Youngstown, O., rolls and rolling machinery, is building for the Old Meadow Rolling Mill, Scottdale, Pa., two 126-inch knife squaring shears to cut ¼-inch packs, one heavy 40-inch roll lathe and one sheet bar shear, to be driven by an electric motor. The company is also building 126-inch knife squaring shears for the Aetna-Standard Iron & Steel Co., Bridgeport, O., Cambridge Iron & Steel Co., Cambridge, O., and Reeves Iron Co., Canal Dover, O., and will ship within the next few days three 24-inch sheet mills to the Cambridge Iron & Steel Co.

Robert Wetherill & Co., Chester, Pa., are partially rebuilding the largest Corliss engine in the United States. It was originally built by R. Wetherill & Co., in 1893, for the Carnegie Steel Co., and has been operating machinery at the Carnegie mills in Homestead, Pa. The original cylinder was 54 inches by 72 inches. The new cylinder is 60 inches by 72 inches stroke.

The Magnolia Metal Co. in the last three or four months has received through the mails 2,827 testimonials on Magnolia metal. These represent every part of the United States and Canada, and were sent in by railroad companies, steamship companies, rolling mills, iron and steel manufacturers of every kind and description, machinists, paper mills, cotton mills, woolen mills, wood-working establishments of all kinds, and practically every class of mechanical industry that can be mentioned. A very small percentage of concerns addressed with an inquiry as to their experience with a given article ever make response, and taking the number of replies actually received in this case, it has been estimated that at

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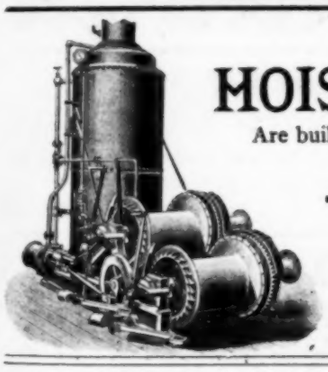

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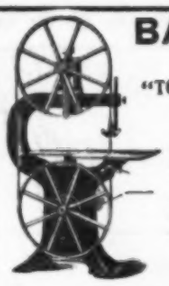

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least 100,000 concerns in the United States and Canada are to-day using Magnolia metal.

The Maryland Steel Co. made the largest month's output of finished material in the history of the Sparrow's Point plant, in January.

The Shelby Steel Tube Co., the combination of the drawn tube manufacturers, is operating five mills. In the specialty department work is going on day and night.

On the $4,000,000 capital stock of the Consolidated Steel & Wire Co. the earnings in the second half of 1897 were 17½ per cent; for the entire year, $1,240,000, or 31 per cent.

Two soaking pit furnaces will be built by the S. R. Smythe Co., Pittsburg, for the South works of the Lackawanna Iron & Steel Co., Scranton, Pa., giving a capacity of 48 ingots, six in each hole, or double the former number. A new stand of rolls will be erected also, which with other improvements will increase the capacity of the plant from 1,000 to 1,200 tons a day.

For the new wire and wire nail mill at Tokio, Japan, the Pittsburg Wire Co. has shipped 500 tons of rods.

Wm. B. Pollock & Co., Youngstown, O., have a contract from the Carnegie Steel Co. for a large amount of riveted plate work.

At Philadelphia, the British steamer Majestic has been chartered to carry 22 locomotives and a general cargo to the Finland Government. The locomotives are being shipped by the Baldwin works. At the Baldwin works locomotives are being built for Norway, Japan, Africa, and other countries which formerly got them elsewhere.

The report that English capital will put $1,000,000 into a steel plant at Birmingham, Ala., has no more established basis than that inquiries are being received as heretofore, from English capitalists, as to the chances of investments in Alabama.

At Pittsburg the Old Kensington iron works of Lloyd, Sons & Co., 2nd ave. and Try st., is being torn down and the machinery will be sold as junk.

The Barney & Smith Car Co., of Dayton, O., is employing 1,400 men, and orders are so pressing that it is working day and night on railway cars, freight and passenger, and street railway cars.

At the opening of bids for 6,340 tons of cast iron pipe for the city of Cleveland, Feb. 3, the lowest bid was $16.73 delivered on streets, or $2.97 less than the successful bid of last year. The following proposals were made. Addyston Pipe & Steel Co., of Cincinnati, cast iron pipe, $16.23 f. o. b.; $16.73 on streets; special castings 2¼c and 2½c per pound; miscellaneous castings 2c and 2¼c per pound. City Foundry Co., Cleveland, special and miscellaneous castings, $33 per ton. Buffalo Cast Iron Pipe Co., of Buffalo, cast iron pipe, $19.50 f. o. b.; special castings, $45 per ton; miscellaneous castings, $60 per ton. James B. Clow & Sons, Chicago, cast iron pipe, $17.75 f. o. b. Lake Shore Foundry Co., Cleveland, cast iron pipe, $17.45 on streets; special castings, from 3 to 12 inches, $34 per ton; from 16 to 36 inches, $38 per ton; and from 42 to 48 inches, $44 per ton. Patterson Foundry Co., Cleveland, special castings, 3 to 12 inches, $36 per ton; 16 to 48 inches, $40 per ton; miscellaneous castings, $36 per ton. R. D. Wood & Co., Philadelphia, failed to enclose a certified check in their bid and it was thrown out as informal. The bids were taken under advisement. The Lake Shore Foundry Co. had the contract last year.

It is the expectation that work will begin in the spring on 25 new coke ovens for the Stewart Iron Co., Sharon, Pa. It is

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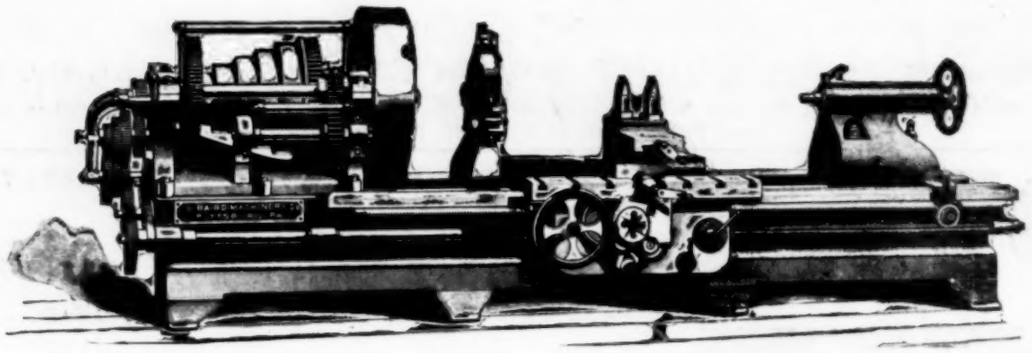
Machine Tools and Supplies.



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probable that some addition will be made to the blowing capacity of the furnace.

At Providence, R. I., Feb. 4, the Rhode Island Locomotive Works filed its petition in insolvency. Geo. H. Wilson, the treasurer, was appointed custodian of the property. The schedule of assets shows $518,376.57, with liabilities amounting to $616,703.85. Among the creditors are: The Paige Car Wheel Co., Cleveland, $4,937.36; Bement, Miles & Co., Philadelphia, $10,137.81; Congdon & Carpenter Co., $9,928.12; Charles Scott Spring Co., Philadelphia, $9,041.49; Westinghouse Air Brake Co., $5,225.72; Otis Steel Co., Cleveland, $4,646.14; American Brake Co., St. Louis, $4,273.89; Barnum Richardson Co., Lime Rock, Conn., $3,915.76; Carbon Steel Co., Pittsburg, $3,492.42; Midvale Steel Co., $5,211.23.

The Davis & Egan Machine Tool Co., of Cincinnati, O., has just received through its Berlin office, an order for a 30x30x8 planer, and a 36-inch drill press, from Heuschell & Son, of Cassel, Germany; also an order for 36-inch lathes, automatic screw machines, and 6 ft. radial drills from the Maschinen Fabrik Hohenzollern at Dusseldorf, Germany. These two companies are large builders of locomotives.

The Westinghouse Electric & Mfg. Co. is employing at its plant at East Pittsburg, Pa., 2,500 hands and some departments are running night and day. A Boston special says: "The arrangement between the Westinghouse and the General electric companies with reference to the use of each other's patterns has given rise to the belief that this really amounts to a practical division of the contracts or to the practical division of certain contracts. As a matter of fact, however, the Westinghouse and General Electric Companies are to all intents and purposes as much competitors as ever, and it is the intention of the Westinghouse people, at an early date, to issue a formal statement in connection with their trade catalogues, or in some other form, setting forth the nature of the existing agreement and its actual working effect."

The Davis & Egan Machine Tool Co., of Cincinnati, has purchased for its Covington, Ky., plant a 25-ton electric crane with 50-foot span, from the Morgan Engineering Co., of Alliance, O. The Cincinnati company has just booked an order from Julius G. Neville & Co., of Madrid and Barcelona, Spain, amounting to $10,000, including lathes, planers, shapers, boring mills, bolt cutters, drill presses, radial drills, brass working tools, and screw machines.